J. Merlin Fierberg
35 High Hill Rd
Bloomfield, CT 06002

# MFJ GRANDMASTER MEMORY KEYER

## MODEL MFJ-482

AC adapter not supplied.
Optional AC adapter, $7.95

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**

**MFJ ENTERPRISES, INC.**

**P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA**

MFJ-1200-0029

© MFJ ENTERPRISES, INC. 1979

# INTRODUCTION

The **MFJ-482 GRANDMASTER MEMORY KEYER** is a sophisticated memory keyer using CMOS Integrated Circuits and a Random Access Memory. It has 1042 bits of memory space that will store approximately 100 characters (four 25 character or two 25 and one 50 character message). To insure full benefit of this memory keyer, please read this instruction manual before operating.

# CONTROL FUNCTIONS

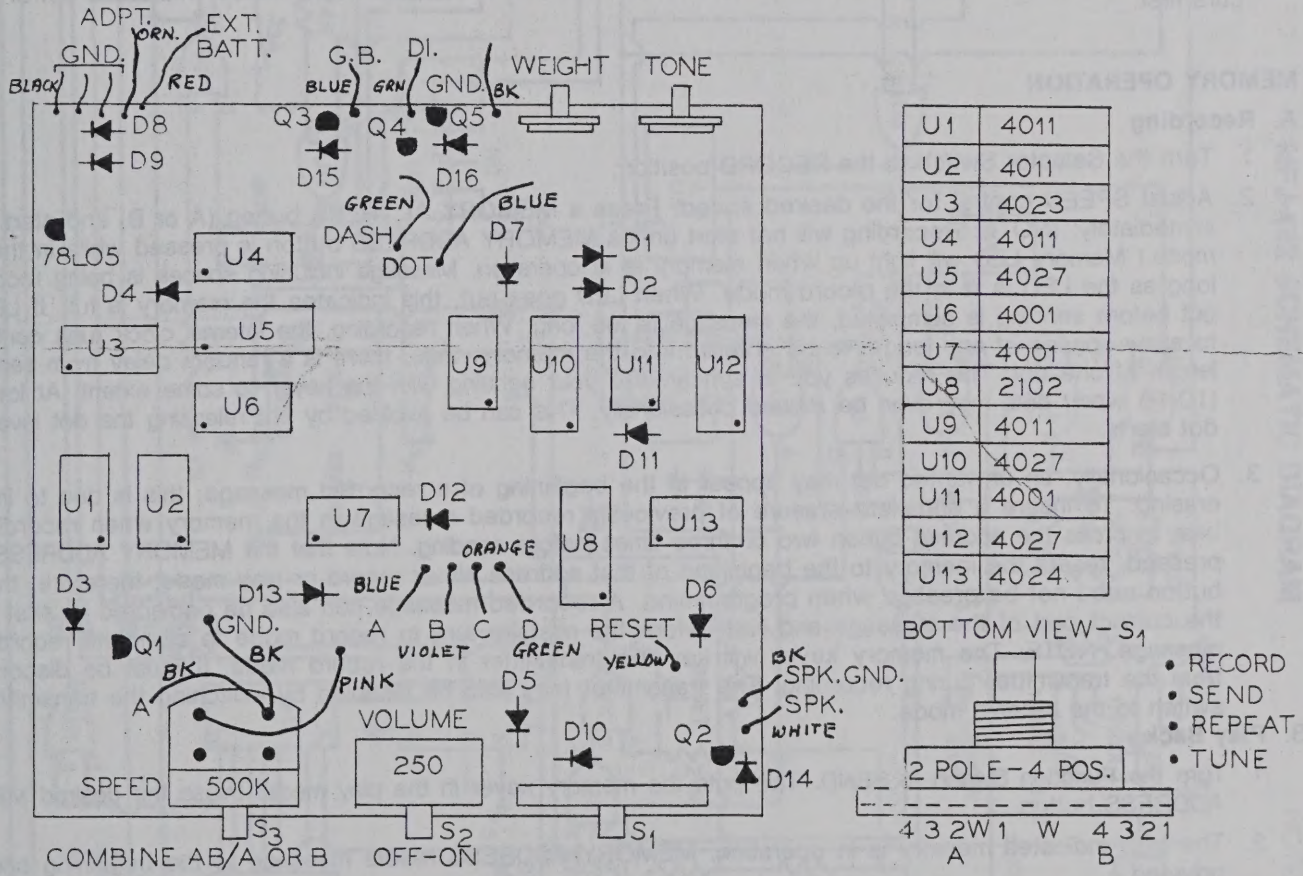
1. **SPEED CONTROL.** Speed is variable from 8 to 50 wpm. **Pull** this control out to combine A and B memory addresses.
2. **WEIGHT CONTROL.** This control is located on the rear panel. When turned fully counter clockwise, dot-dash-space ratio is a perfect 1:3:1. Turn this control clockwise to increase dot and dash lengths.
3. **TONE CONTROL.** This control is located on the rear panel. Use it to adjust for desired sidetone pitch.
4. **VOLUME CONTROL** to adjust the loudness of sidetone. Turn this control fully counter clockwise to turn off the memory keyer. All messages stored in memory are erased when this control is turned off. **Keep power on to maintain memory.**
5. **RECORD, SEND, REPEAT, TUNE FUNCTION SWITCH.** The RECORD position sets the memory keyer in the record mode for recording messages into memory. The SEND position allows playing back recorded messages and allows the memory keyer to be used as an electronic keyer. The REPEAT position allows repeating the recorded messages continuously. The TUNE position keys your transmitter continuously for tuning.
6. **RESET BUTTON.** It is used to stop memory from operating. When sending a recorded message, memory can be stopped by pressing the reset button or by tapping the keyer paddle. This resets all memory addresses to the beginning.
7. **LED INDICATOR** shows when memory is in operation.
8. **MEMORY ADDRESS.** Four push buttons A, B, C and D are used to directly address the memory. Press a MEMORY ADDRESS button to start a message. Memory operation can be interrupted by pressing another MEMORY ADDRESS button without pressing the RESET button first.
9. **MEMORY SAVER.** An internal 9 volt battery (not included, alkaline type recommended) switches in automatically when a 110 volt AC power failure occurs. This allows all messages to be retained. A battery clip and holder are provided for installation of a 9 volt alkaline battery. If the sidetone is not used, the MEMORY SAVER has an operation time of approximately eight hours. If longer storage time is needed an external battery of 12-15 VDC may be connected to the battery jack on the memory keyer. **MEMORY SAVER is also turned off when the VOLUME control is turned off.**

# INSTALLATION

1. To install the memory saver battery, remove the two screws near the rear top. Slide the cover toward the back and remove. Connect a 9 volt battery to the battery snap then insert the battery into the holder. A 9 volt alkaline battery should be used. When the memory saver battery is not used, cover the battery snap with the plastic tubing supplied to prevent shorting.
2. The MFJ-482 comes with a 110 volt AC adapter. First plug the adapter into the sub miniature jack on the rear panel and then plug the adapter in the 110 VAC wall socket. It is not necessary to unplug the AC adapter when the memory keyer is not in use.
3. During portable use when 110 VAC is not available, plug external batteries into the 12-15 VDC sub miniature jack on the rear panel. External batteries and the memory saver can never come into use unless power from the adapter is lost. The tip of the sub miniature plug is positive and the sleeve is ground, for the AC adapter and external batteries.
4. A squeeze or single lever key can be used. Squeeze key allows IAMBIC operation. Use a standard quarter inch stereo phone plug and a two conductor shielded cable or two separately shielded cables. Tie the shields together and use it for ground. The dot wire should be connected to the ring of the plug, the dash wire to the tip and the shield to ground.
5. A reliable solid state keying circuit allows keying of all grid block, cathode, and solid state transmitters. For grid block keying use the "Grid Block" keying output. For cathode keyed and solid state transmitter, use the "Direct" keying output. Try both outputs if you are uncertain to which output to use. The keyer outputs are self protected. The "Grid Block" output keys a maximum negative voltage of 300 volts to ground at 10 ma. The "Direct" output keys a maximum positive voltage of 300 volts to ground at a maximum current of 100 ma. Use a shielded cable to connect between the memory keyer and the transmitter key input.

# OPERATION NOTES

1. Shielded cables must be used between the key and the memory keyer jack and between the keyer output and the transmitter to prevent RF interference.
2. If an unwanted dot should appear at the beginning of a recorded message, press the desired MEMORY ADDRESS button two or three times in the record mode before programming.
3. Cover the battery snap if memory saver battery is not in use. Use the plastic tubing provided.
4. Use only the MFJ AC adaptor supplied. Do not use more than 15 volts for the external battery. The tip of the sub miniature jack is positive and the sleeve is ground.




| | |
|---|---|
| U1 | 4011 |
| U2 | 4011 |
| U3 | 4023 |
| U4 | 4011 |
| U5 | 4027 |
| U6 | 4001 |
| U7 | 4001 |
| U8 | 2102 |
| U9 | 4011 |
| U10 | 4027 |
| U11 | 4001 |
| U12 | 4027 |
| U13 | 4024 |




**MFJ-482 COMPONENTS LOCATION DIAGRAM**

# OPERATION PROCEDURE

## I. KEYER OPERATION

1. Apply power to the memory keyer. Use the AC adapter provided.
2. Plug in key paddle to the KEY jack. A dual paddle squeeze key or a single lever key can be used.
3. Turn Function Switch to SEND position.
4. Turn SPEED control clockwise to turn on memory keyer.
5. Start sending with paddle and adjust volume, tone, and speed. The VOLUME control is located on the rear panel. TONE is an internal adjustment. Remove cover by removing two top rear screws to make this adjustment.
6. The dot and dash memories ease sending by allowing keying the dot before the completion of the dash or vice versa. This feature can be checked by setting to the lowest speed and tap first the dash lever then the dot lever before the completion of the dash. The keyer will provide both the dash and the dot. The dash memory can be checked by first tapping the dot then the dash. The dot insertion features allows you to tap the dot side to insert a dot while holding the dash side in. The dash insertion feature allows you to tap the dash side to insert a dash while holding the dot side in. When using squeeze key and with both paddles squeezed together the iambic operation feature allows sending of alternate dots and dashes. The first contact determines whether a dot or dash occurs first.

## II. MEMORY OPERATION

### A. Recording

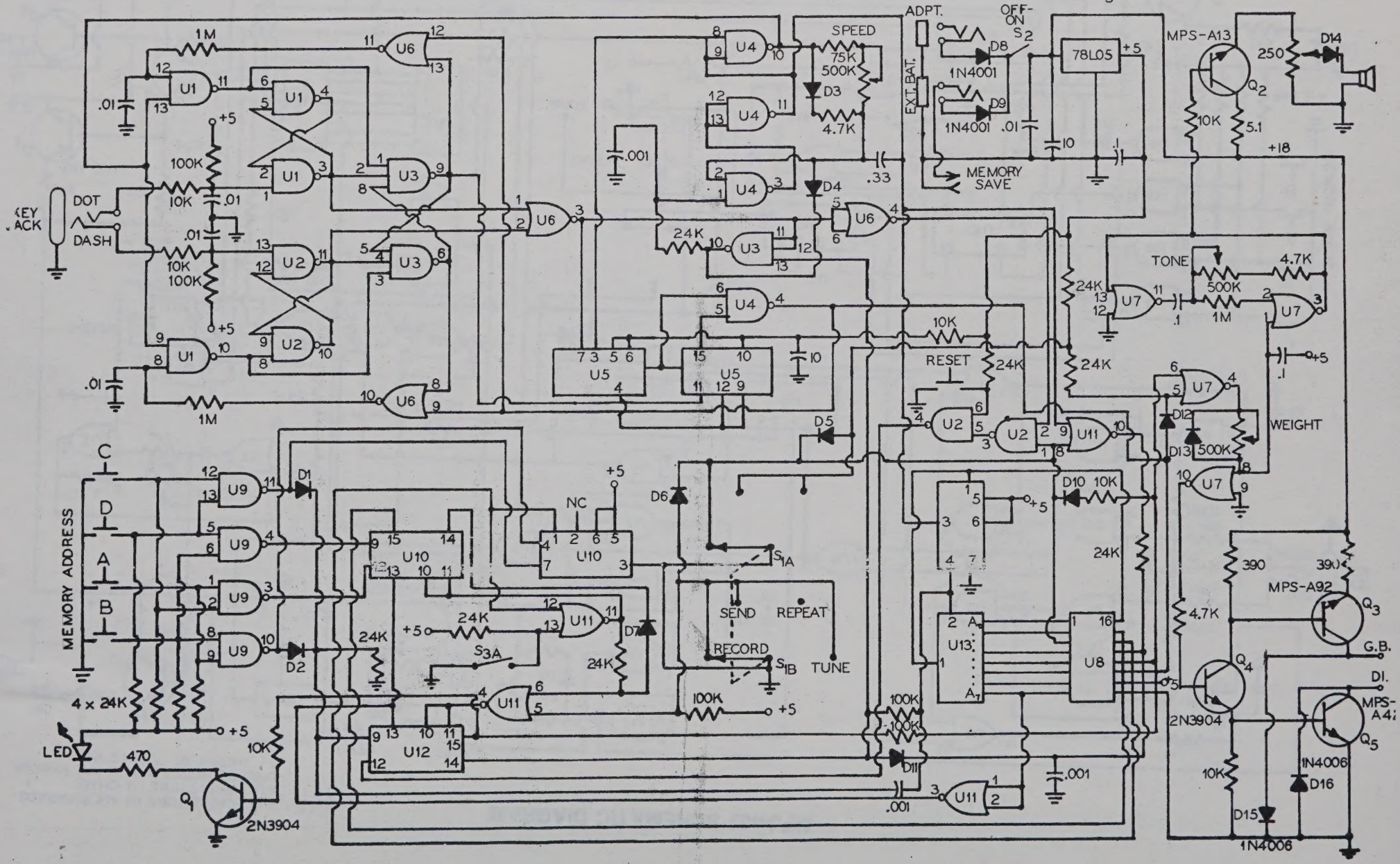
1. Turn the Selector Switch to the RECORD position.
2. Adjust SPEED control for the desired speed. Press a MEMORY ADDRESS button (A or B) and start sending immediately. (NOTE: Recording will not start until a MEMORY ADDRESS button is pressed while in the record mode.) Memory LED will light up when memory is in operation. Message including spaces is being recorded as long as the LED is lit in the record mode. When LED goes out, this indicates the memory is full. If LED goes out before sending is completed, the message is too long. When recording, the internal clock runs continuously to allow spaces of any length to be entered into the memory; thus, there is a random delay from zero to the length of one dot. This requires you to synchronize your sending with the keyer to some extent. At low speed (10-15 wpm) dots may even be missed occasionally. This can be avoided by not releasing the dot lever until a dot starts.
3. Occasionally, an unwanted dot may appear in the beginning of a recorded message; this is due to improper erasing. To insure a complete erasure of previously recorded message in the memory when recording it is best to press the address button two or three times before sending. Note that the MEMORY ADDRESS, when pressed, resets the memory to the beginning of that address either record or play mode; therefore, the reset button need not be pressed when programming. A recorded message can also be corrected by first playing the correct part of the message and just before the mistake turn to record mode to complete recording the message. NOTE: The memory keyer will key the transmitter in the record mode. It must be disconnected from the transmitter during recording. The transmitter may also be disabled by switching the transmit/receive switch to the receive mode.

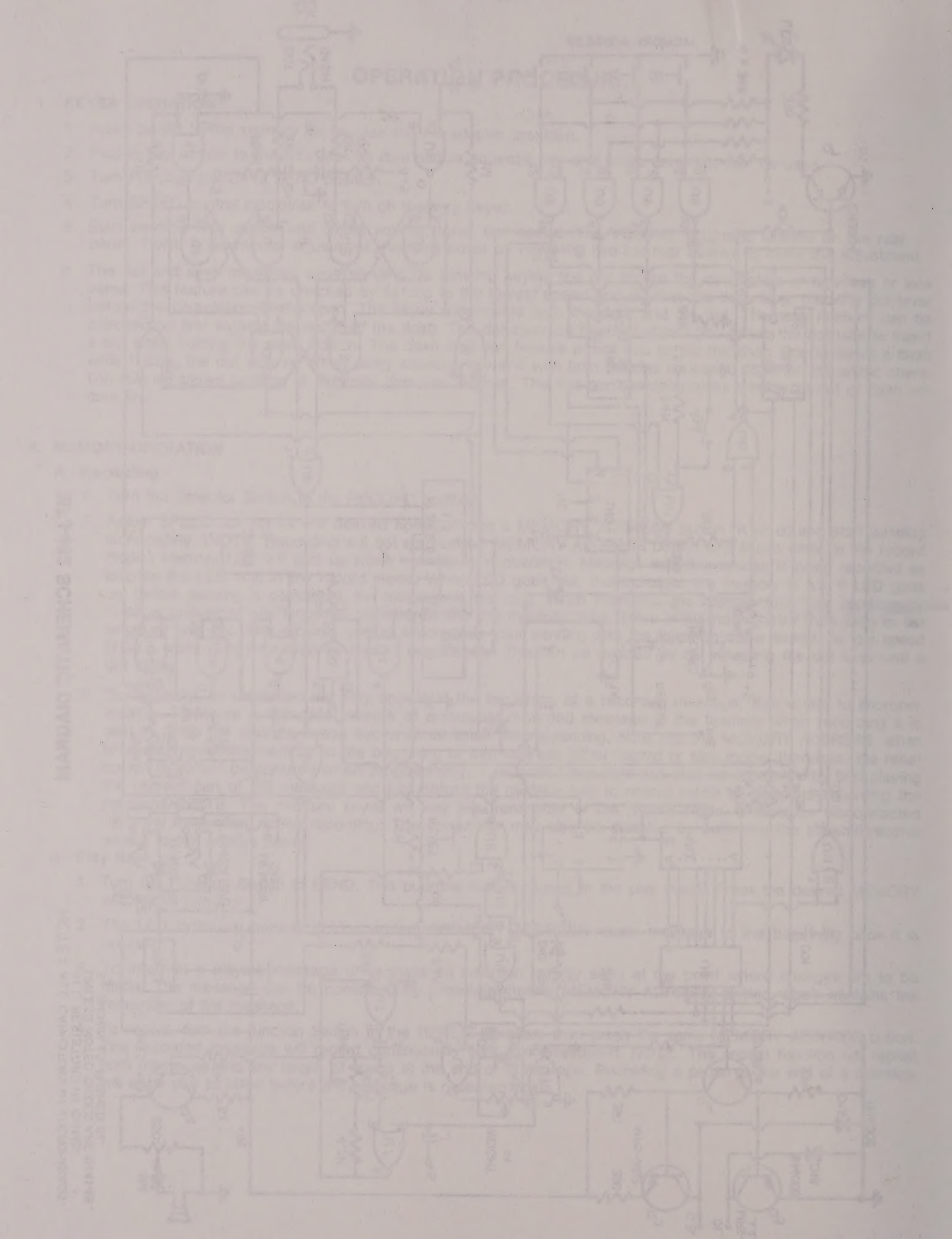
### B. Play Back

1. Turn the Function Switch to SEND. This puts the memory keyer in the play mode. Press the desired MEMORY ADDRESS button.
2. The LED indicates memory is in operation. MEMORY ADDRESS resets message to the beginning once it is pressed.
3. To interrupt a playing message or to make an insertion, simply send at the point where changes are to be made. The message can be continued by pressing another MEMORY ADDRESS button which contains the remainder of the message.
4. To repeat, turn the function Switch to the REPEAT Position, then press the same MEMORY ADDRESS button. The recorded message will repeat continuously until it is interrupted. NOTE: The repeat function will repeat both messages and any length of space at the end of a message. Recording a pause at the end of a message will allow you to listen before the message is repeated again.

# MFJ-482 SCHEMATIC DIAGRAM

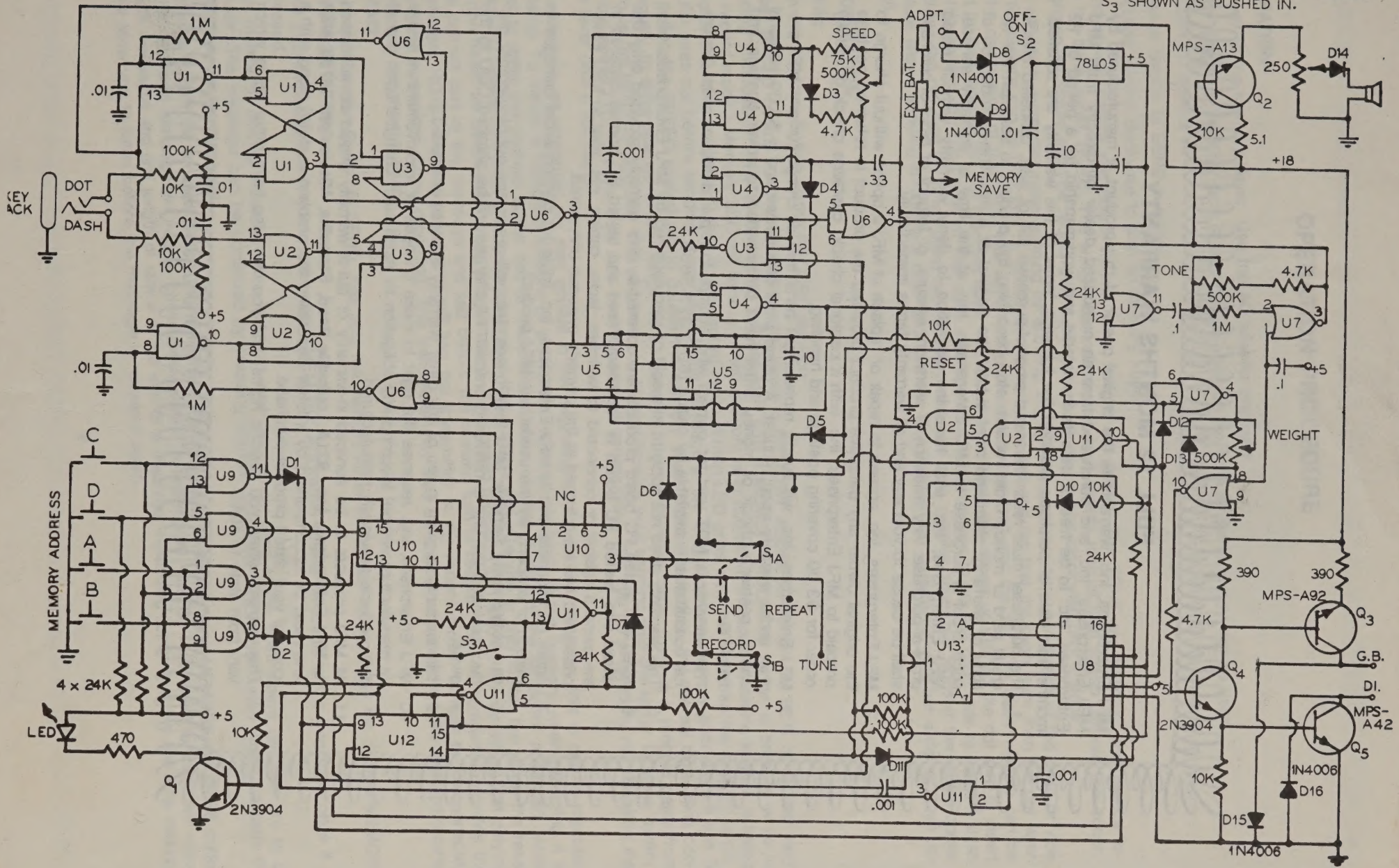
NOTE: ALL CAPACITORS IN MICROFARADS.
ALL RESISTORS IN OHMS.
UNLESS NOTED DIODES ARE 1N4148.
$S_3$ SHOWN AS PUSHED IN.





# MFJ-482 SCHEMATIC DIAGRAM

NOTE: ALL CAPACITORS IN MICROFARADS.
ALL RESISTORS IN OHMS.
UNLESS NOTED DIODES ARE 1N4148.
$S_3$ SHOWN AS PUSHED IN.



## FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for $3.00 covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a $3.00 personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is delivered prepaid. All charges will be shipped COD to the owner.
9. This warranty is given in lieu of any other warranty express or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvement in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 921A Louisville Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

# OPERATION PROCEDURE

## I KEYER OPERATION

1. Apply power to the memory keyer. Use the AC adapter provided.
2. Plug in key paddle to the KEY jack. A dual paddle squeeze key or a single lever key can be used.
3. Push the SPEED control in.
4. Turn Function Switch to SEND position.
5. Turn VOLUME control clockwise to turn on memory keyer.
6. Start sending with paddle and adjust volume, tone, weight and speed. The TONE and WEIGHT controls are located in the back panel. NOTE: The weight control may cause a steady tone at high speed. Should this occur, the weight or the speed must be reduced by turning the controls counter clockwise until it stops.
7. The dot and dash memories ease sending by allowing keying the dot before the completion of the dash or vice versa. This feature can be checked by setting to the lowest speed and tap first the dash lever then the dot lever before the completion of the dash. The keyer will provide both the dash and the dot. The dash memory can be checked by first tapping the dot then the dash. The dot insertion features allows you to tap the dot side to insert a dot while holding the dash side in. The dash insertion feature allows you to tap the dash side to insert a dash while holding the dot side in. When using squeeze key and with both paddles squeezed together the iambic operation feature allows sending of alternate dots and dashes. The first contact determines whether a dot or dash occurs first.

## II. MEMORY OPERATION

### A. Recording

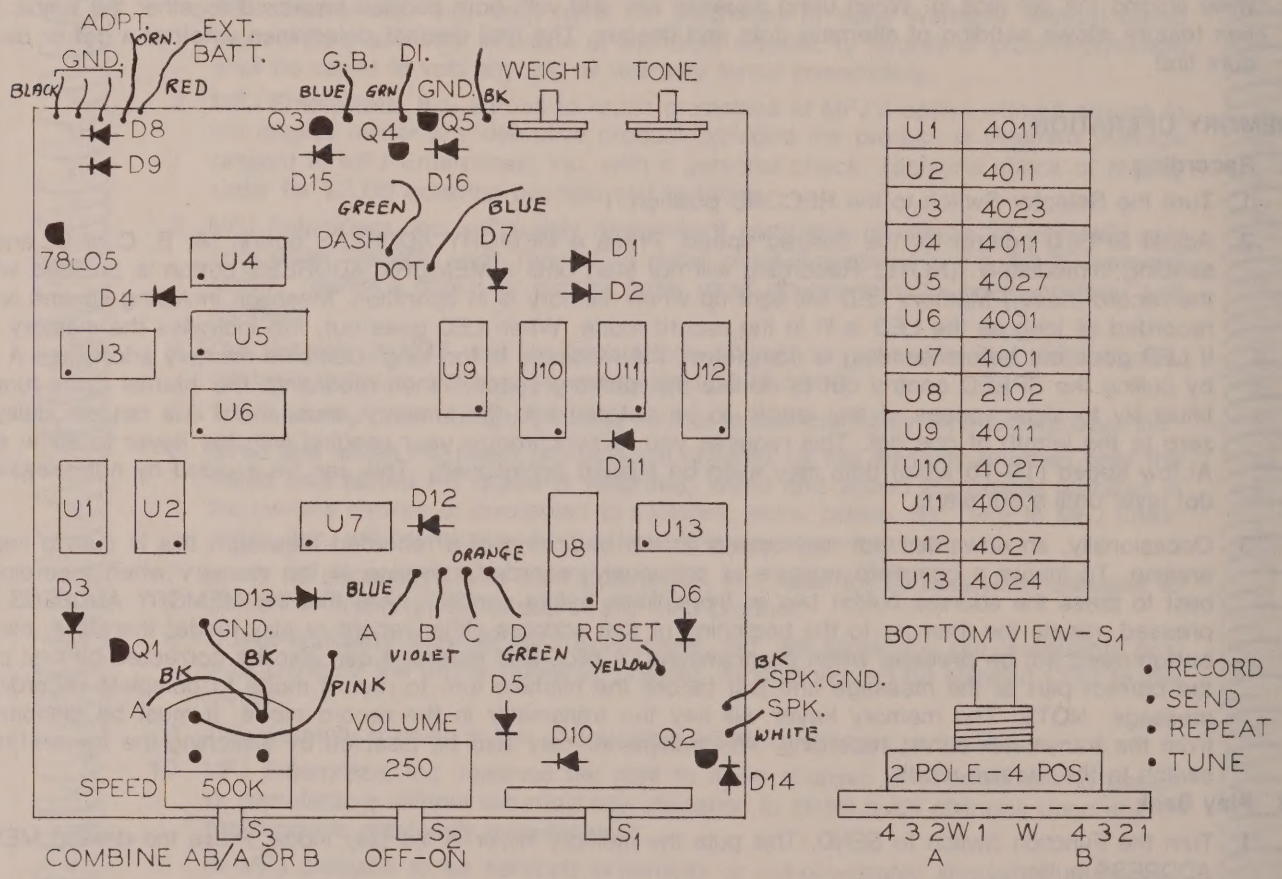
1. Turn the Selector Switch to the RECORD position.
2. Adjust SPEED control for the desired speed. Press a MEMORY ADDRESS button (A, B, C or D) and start sending immediately. (NOTE: Recording will not start until a MEMORY ADDRESS button is pressed while in the record mode.) Memory LED will light up when memory is in operation. Message including spaces is being recorded as long as the LED is lit in the record mode. When LED goes out, this indicates the memory is full. If LED goes out before sending is completed, the message is too long. Combine memory addresses A and B by pulling the SPEED control out to double the memory space. When recording, the internal clock runs continuously to allow spaces of any length to be entered into the memory; thus, there is a random delay from zero to the length of one dot. This requires you to synchronize your sending with the keyer to some extent. At low speed (10-15 wpm) dots may even be missed occasionally. This can be avoided by not releasing the dot lever until a dot starts.
3. Occasionally, an unwanted dot may appear in the beginning of a recorded message; this is due to improper erasing. To insure a complete erasure of previously recorded message in the memory when recording it is best to press the address button two or three times before sending. Note that the MEMORY ADDRESS, when pressed, resets the memory to the beginning of that address either record or play mode; therefore, the reset button need not be pressed when programming. A recorded message can also be corrected by first playing the correct part of the message and just before the mistake turn to record mode to complete recording the message. NOTE: The memory keyer will key the transmitter in the record mode. It must be disconnected from the transmitter during recording. The transmitter may also be disabled by switching the transmit/receive switch to the receive mode.

### B. Play Back

1. Turn the Function Switch to SEND. This puts the memory keyer in the play mode. Press the desired MEMORY ADDRESS button.
2. The LED indicates memory is in operation. MEMORY ADDRESS resets message to the beginning once it is pressed.
3. To interrupt a playing message or to make an insertion, simply send at the point where changes are to be made. The message can be continued by pressing another MEMORY ADDRESS button which contains the remainder of the message.
4. To repeat, turn the function Switch to the REPEAT Position, then press the same MEMORY ADDRESS button. The recorded message will repeat continuously until it is interrupted. NOTE: The repeat function will repeat both messages and any length of space at the end of a message. Recording a pause at the end of a message will allow you to listen before the message is repeated again.

## OPERATION NOTES

1. Shielded cables must be used between the key and the memory keyer jack and between the keyer output and the transmitter to prevent RF interference.
2. If an unwanted dot should appear at the beginning of a recorded message, press the desired MEMORY ADDRESS button two or three times in the record mode before programming.
3. Cover the battery snap if memory saver battery is not in use. Use the plastic tubing provided.
4. Use only the MFJ AC adaptor supplied. Do not use more than 15 volts for the external battery. The tip of the sub miniature jack is positive and the sleeve is ground.




| | |
|---|---|
| U1 | 4011 |
| U2 | 4011 |
| U3 | 4023 |
| U4 | 4011 |
| U5 | 4027 |
| U6 | 4001 |
| U7 | 4001 |
| U8 | 2102 |
| U9 | 4011 |
| U10 | 4027 |
| U11 | 4001 |
| U12 | 4027 |
| U13 | 4024 |

**MFJ-482 COMPONENTS LOCATION DIAGRAM**

**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


## MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

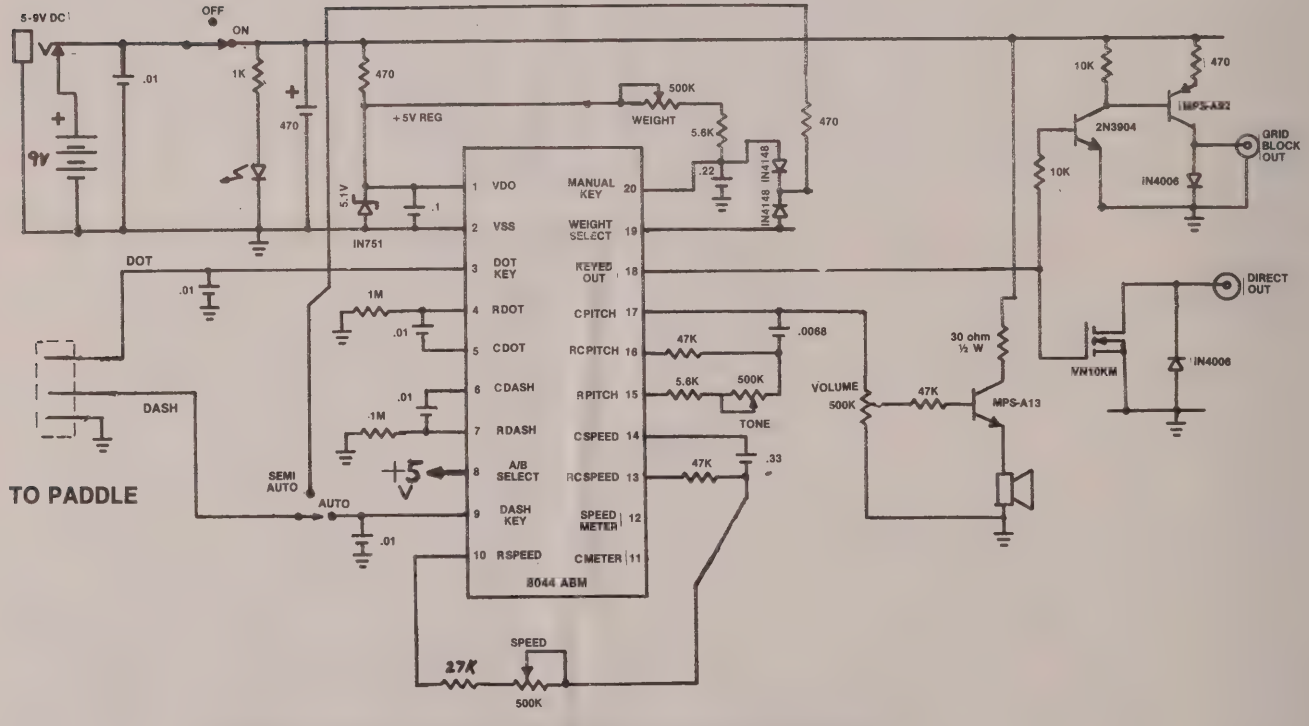
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, redu

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**

**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


## MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)

## FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for **$4.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a **$4.00** personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is delivered prepaid. All charges will be shipped COD to the owner.
9. This warranty is given in lieu of any other warranty express or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvement in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 921A Louisville Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

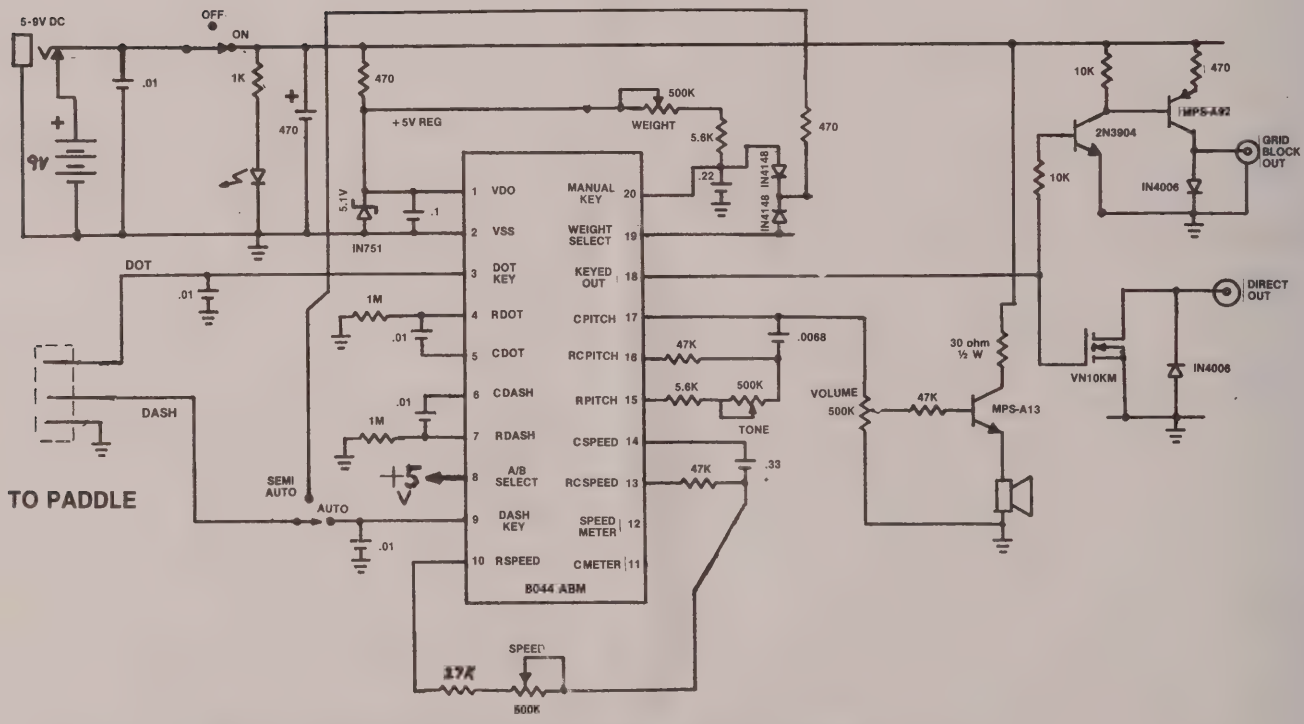
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

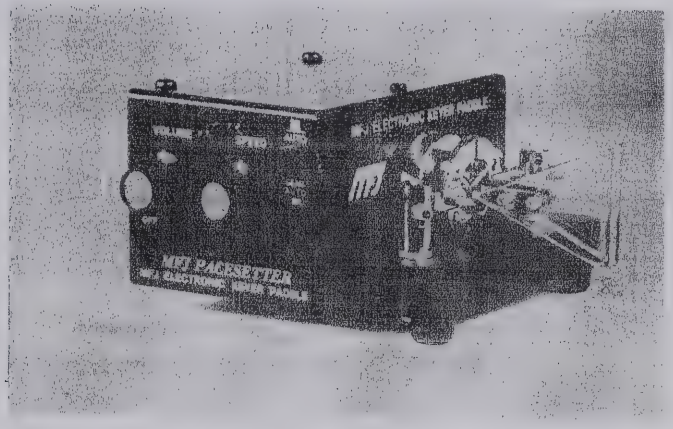
After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, reduce

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**



**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


## MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

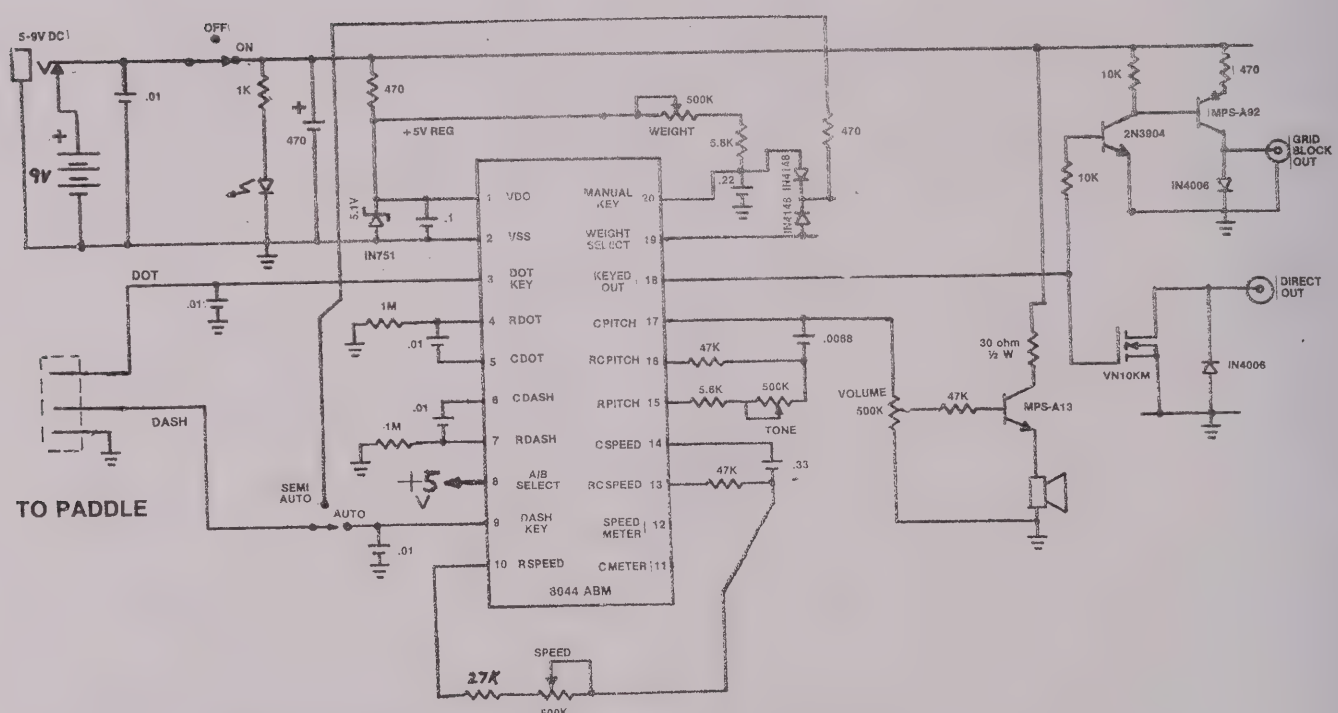
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, redu

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**

Christmas 1989

**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


## MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

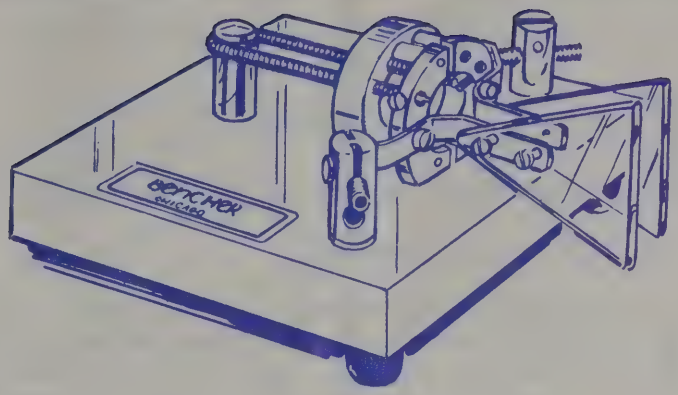
1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)



## BENCHER PADDLE

Your Bencher Ultimate Paddle is the finest iambic paddle ever offered to the market. It is made of the finest material and should give a lifetime of use.

## ADJUSTMENTS

Connect the paddle to the keyer in the usual manner. Vary contact spacing to suit your personal preference by loosening the set screws in the split posts (with wrench provided) and turn the contact screw to the desired spacing. Re-tighten the set screw.

Keyer lever tension adjustment is changed by varying the length of the small screws attached to the spring on the split ring. The lightest touch, or minimum tension, is achieved with these screws all the way in. To increase tension, back the screws out to the desired level.

The contact points are solid silver with a gold plating, requiring little or no cleaning under normal conditions. If cleaning is determined to be necessary, do so by drawing a clean piece of paper through them. Do not, under any circumstances, use any form of file or sandpaper.

## LLAVE TELEGRAFICA BENCHER

Su llave telegráfica Bencher ULTIMATE es la más fina llave iámbica jamás ofrecida al mercado. Se utilizan los materiales más finos para su fabricación, y debe dar una vida entera de servicio.

## AJUSTES

Conecte la llave al conmutador electrónico (keyer) de la manera usual. Varíe el espaciamiento de los contactos para adaptarse a su preferencia individual, aflojando los tornillos de retención de los postes divididos (usar la llave provista para ello) y girando el tornillo de los contactos hasta el punto deseado. Aprete nuevamente los tornillos de retención.

La tensión del brazo de la llave se ajusta variando la longitud de los pequeños tornillos unidos al resorte en el anillo dividido. Se obtiene el tacto más liviano, o tensión mínima, con los tornillos completamente hacia adentro. Para aumentar la tensión, saque los tornillos hacia afuera hasta el punto deseado.

Los contactos son de plata sólida, bañada en oro, y requieren poca o ninguna limpieza en condiciones normales. Si se determina que se requiere limpiarlos, se lo hace pasando un pedazo de papel limpio entre ellos. No use, bajo ninguna circunstancia, ninguna forma de lima o papel de lija.

BENCHER, INC.

333 WEST LAKE STREET CHICAGO, ILLINOIS 60606 PHONE (312) 263-1808

## La clé morse Bencher

Votre clé morse Bencher est la clé Iambic de manipulation de la plus belle qualité jamais offerte sur le marché.

## Réglages

Connectez la clé de manipulation à votre manipulateur électronique de la façon habituelle.
Ajustez l'espace des contacts pour correspondre à votre préférence, en débloquant les vis d'arrêt dans les colonnes porte-contacts à l'aide le la clé hexagonale (fournie) et tournez les vis de contact jusqu'à la position désirée. Rebloquez les vis d'arrêt. On change la dureté du levier en variant la longueur des petites vis attachées au ressort sur les deux demi-cercles. La pression minimum, ou tension minimum, est obtenue avec ces vis entièrement serrées. Pour augmenter la tension, dévissez ces vis à la valeur désirée.
Les contacts sont en argent pur plaqué or et doivent être nettoyés uniquement en passant un bout de papier propre entre eux. N'utilisez sous aucun prétexte, aucune sorte de lime ou de papier de verre.

## BENCHER PRÄZISIONS-WABBLER

Wir beglückwünschen Sie zum Kauf dieses Präzisions-Wabblers, mit dem Sie einen der besten auf dem internationalen Markt verfügbaren Squeeze-Wabbler besitzen. Hergestellt aus hochwertigstem Material, wird er Ihnen bei pfleglicher Behandlung viele Jahre lang Freude bereiten.

## EINSTELLHINWEISE

Wabbler mit dem elektronischen Tastgenerator verbinden. Der Kontakthub (der Abstand der Kontakte zueinander) lässt sich je nach persönlichem Geschmack innerhalb normaler Grenzen verändern. Hierzu die Feststellschrauben in den beiden senkrecht angeordneten Kontaktträgern mit dem mitgelieferten Sechskantschlüssel lösen und die Kontaktschrauben auf den gewünschten Hub justieren. Feststellschrauben nach erfolgter Einstellung wieder anziehen.

Die Federspannung des Wabblers kann durch Verändern der Länge der kleinen Schrauben eingestellt werden, die auf den beweglichen Halbringen sitzen und als Aufhängung für die Zugfeder dienen. Grösste Leichtgängigkeit wird erreicht, wenn beide Schräubchen ganz eingedreht sind, also voll in die Halbringe hineinragen. Erscheint die Federspannung zu gering, Schräubchen einfach herausdrehen, so dass deren Enden nicht mehr so weit nach innen durchragen, bis die gewünschte Federspannung erreicht ist.

Die Wabbler-Kontakte bestehen aus reinem Silber mit Goldüberzug und dürfen nur ganz vorsichtig gesäubert werden. Dies geschieht am besten mit einem sauberen Blättchen Papier, das man behutsam über die Kontakte zieht, um eventuelle Oxydablagerungen zu beseitigen. Unter keinen Umständen mit Feile oder Sandpapier arbeiten - Zerstörung der Kontakte wäre die unausweichliche Folge!

BENCHER, INC.

333 WEST LAKE STREET CHICAGO, ILLINOIS 60606 PHONE (312) 263-1808

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

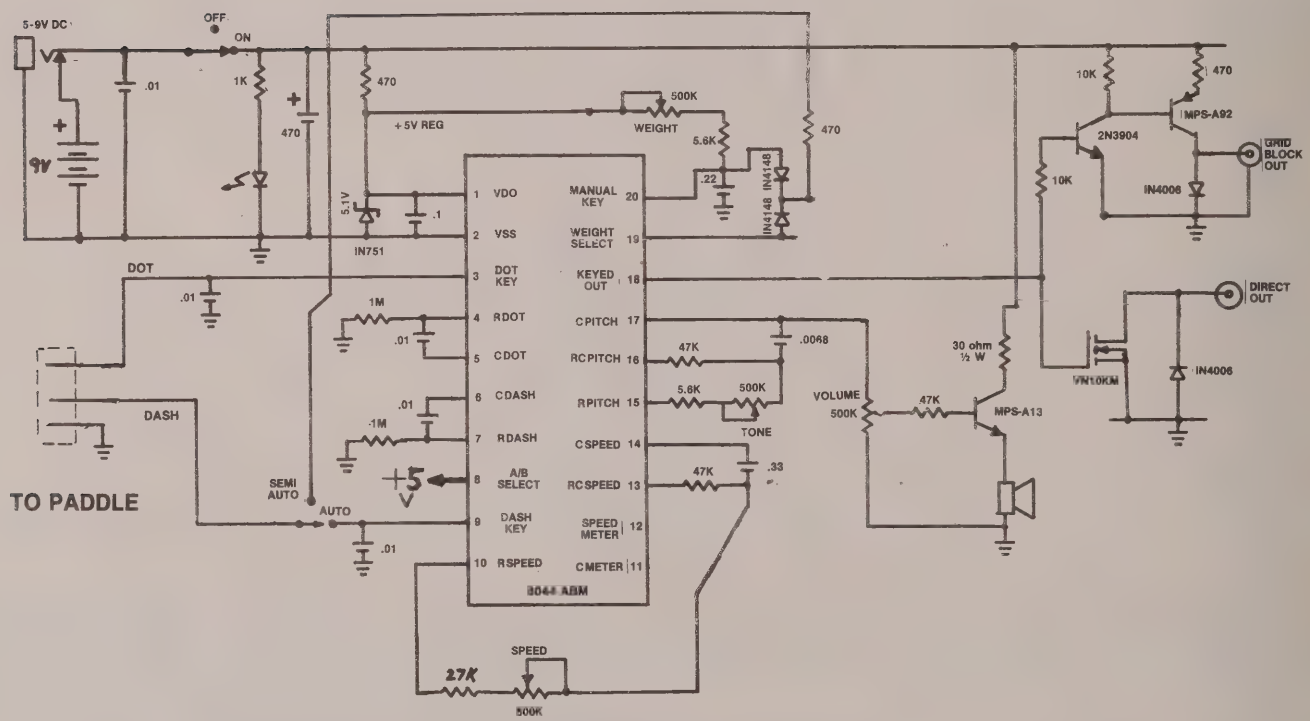
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, redu

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.



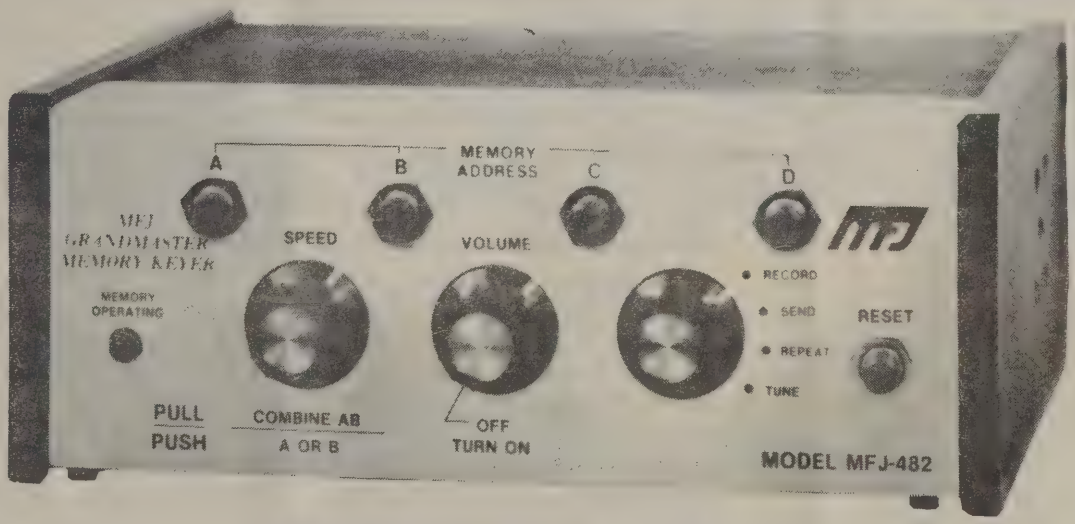

**MFJ-422B/422B-X SCHEMATIC DIAGRAM**

I. Martin Fierberg
35 High Hill Rd
Bloomfield, CT 06002

# *MFJ GRANDMASTER MEMORY KEYER*

## MODEL MFJ-482

*AC adapter not supplied.*
*Optional AC adapter, $7.95*




# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**

**MFJ ENTERPRISES, INC.**
**P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA**

MFJ-1200-0029

© MFJ ENTERPRISES, INC. 1979

# INTRODUCTION

The **MFJ-482 GRANDMASTER MEMORY KEYER** is a sophisticated memory keyer using CMOS Integrated Circuits and a Random Access Memory. It has 1042 bits of memory space that will store approximately 100 characters (four 25 character or two 25 and one 50 character message). To insure full benefit of this memory keyer, please read this instruction manual before operating.

# CONTROL FUNCTIONS

1. **SPEED CONTROL.** Speed is variable from 8 to 50 wpm. **Pull** this control out to combine A and B memory addresses.
2. **WEIGHT CONTROL.** This control is located on the rear panel. When turned fully counter clockwise, dot-dash-space ratio is a perfect 1:3:1. Turn this control clockwise to increase dot and dash lengths.
3. **TONE CONTROL.** This control is located on the rear panel. Use it to adjust for desired sidetone pitch.
4. **VOLUME CONTROL** to adjust the loudness of sidetone. Turn this control fully counter clockwise to turn off the memory keyer. All messages stored in memory are erased when this control is turned off. **Keep power on to maintain memory.**
5. **RECORD, SEND, REPEAT, TUNE FUNCTION SWITCH.** The RECORD position sets the memory keyer in the record mode for recording messages into memory. The SEND position allows playing back recorded messages and allows the memory keyer to be used as an electronic keyer. The REPEAT position allows repeating the recorded messages continuously. The TUNE position keys your transmitter continuously for tuning.
6. **RESET BUTTON.** It is used to stop memory from operating. When sending a recorded message, memory can be stopped by pressing the reset button or by tapping the keyer paddle. This resets all memory addresses to the beginning.
7. **LED INDICATOR** shows when memory is in operation.
8. **MEMORY ADDRESS.** Four push buttons A, B, C and D are used to directly address the memory. Press a MEMORY ADDRESS button to start a message. Memory operation can be interrupted by pressing another MEMORY ADDRESS button without pressing the RESET button first.
9. **MEMORY SAVER.** An internal 9 volt battery (not included, alkaline type recommended) switches in automatically when a 110 volt AC power failure occurs. This allows all messages to be retained. A battery clip and holder are provided for installation of a 9 volt alkaline battery. If the sidetone is not used, the MEMORY SAVER has an operation time of approximately eight hours. If longer storage time is needed an external battery of 12-15 VDC may be connected to the battery jack on the memory keyer. **MEMORY SAVER is also turned off when the VOLUME control is turned off.**

# INSTALLATION

1. To install the memory saver battery, remove the two screws near the rear top. Slide the cover toward the back and remove. Connect a 9 volt battery to the battery snap then insert the battery into the holder. A 9 volt alkaline battery should be used. When the memory saver battery is not used, cover the battery snap with the plastic tubing supplied to prevent shorting.
2. The MFJ-482 comes with a 110 volt AC adapter. First plug the adapter into the sub miniature jack on the rear panel and then plug the adapter in the 110 VAC wall socket. It is not necessary to unplug the AC adapter when the memory keyer is not in use.
3. During portable use when 110 VAC is not available, plug external batteries into the 12-15 VDC sub miniature jack on the rear panel. External batteries and the memory saver can never come into use unless power from the adapter is lost. The tip of the sub miniature plug is positive and the sleeve is ground, for the AC adapter and external batteries.
4. A squeeze or single lever key can be used. Squeeze key allows IAMBIC operation. Use a standard quarter inch stereo phone plug and a two conductor shielded cable or two separately shielded cables. Tie the shields together and use it for ground. The dot wire should be connected to the ring of the plug, the dash wire to the tip and the shield to ground.
5. A reliable solid state keying circuit allows keying of all grid block, cathode, and solid state transmitters. For grid block keying use the "Grid Block" keying output. For cathode keyed and solid state transmitter, use the "Direct" keying output. Try both outputs if you are uncertain to which output to use. The keyer outputs are self protected. The "Grid Block" output keys a maximum negative voltage of 300 volts to ground at 10 ma. The "Direct" output keys a maximum positive voltage of 300 volts to ground at a maximum current of 100 ma. Use a shielded cable to connect between the memory keyer and the transmitter key input.

# OPERATION PROCEDURE

## I. KEYER OPERATION

1. Apply power to the memory keyer. Use the AC adapter provided.
2. Plug in key paddle to the KEY jack. A dual paddle squeeze key or a single lever key can be used.
3. Turn Function Switch to SEND position.
4. Turn SPEED control clockwise to turn on memory keyer.
5. Start sending with paddle and adjust volume, tone, and speed. The VOLUME control is located on the rear panel. TONE is an internal adjustment. Remove cover by removing two top rear screws to make this adjustment.
6. The dot and dash memories ease sending by allowing keying the dot before the completion of the dash or vice versa. This feature can be checked by setting to the lowest speed and tap first the dash lever then the dot lever before the completion of the dash. The keyer will provide both the dash and the dot. The dash memory can be checked by first tapping the dot then the dash. The dot insertion features allows you to tap the dot side to insert a dot while holding the dash side in. The dash insertion feature allows you to tap the dash side to insert a dash while holding the dot side in. When using squeeze key and with both paddles squeezed together the iambic operation feature allows sending of alternate dots and dashes. The first contact determines whether a dot or dash occurs first.

## II. MEMORY OPERATION

### A. Recording

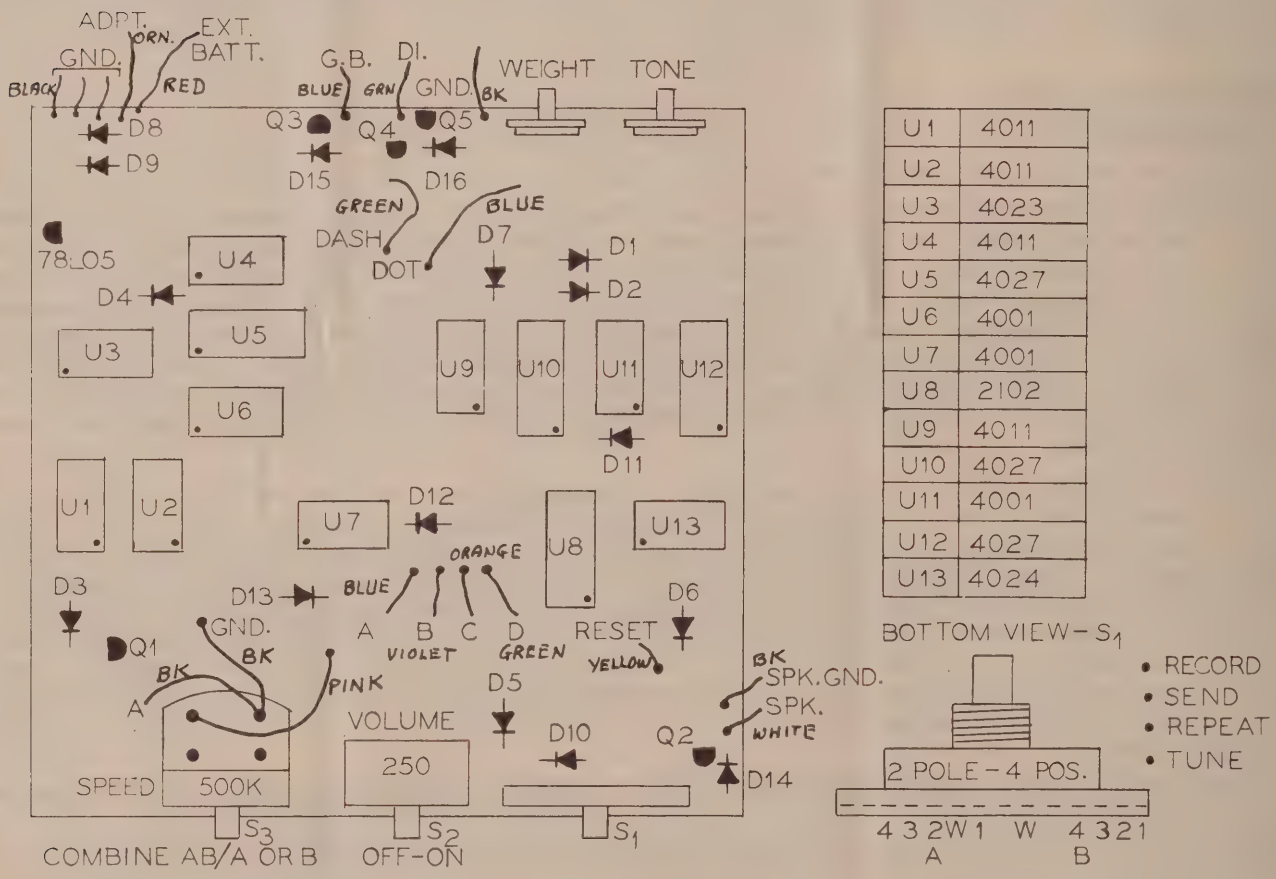
1. Turn the Selector Switch to the RECORD position.
2. Adjust SPEED control for the desired speed. Press a MEMORY ADDRESS button (A or B) and start sending immediately. (NOTE: Recording will not start until a MEMORY ADDRESS button is pressed while in the record mode.) Memory LED will light up when memory is in operation. Message including spaces is being recorded as long as the LED is lit in the record mode. When LED goes out, this indicates the memory is full. If LED goes out before sending is completed, the message is too long. When recording, the internal clock runs continuously to allow spaces of any length to be entered into the memory; thus, there is a random delay from zero to the length of one dot. This requires you to synchronize your sending with the keyer to some extent. At low speed (10-15 wpm) dots may even be missed occasionally. This can be avoided by not releasing the dot lever until a dot starts.
3. Occasionally, an unwanted dot may appear in the beginning of a recorded message; this is due to improper erasing. To insure a complete erasure of previously recorded message in the memory when recording it is best to press the address button two or three times before sending. Note that the MEMORY ADDRESS, when pressed, resets the memory to the beginning of that address either record or play mode; therefore, the reset button need not be pressed when programming. A recorded message can also be corrected by first playing the correct part of the message and just before the mistake turn to record mode to complete recording the message. NOTE: The memory keyer will key the transmitter in the record mode. It must be disconnected from the transmitter during recording. The transmitter may also be disabled by switching the transmit/receive switch to the receive mode.

### B. Play Back

1. Turn the Function Switch to SEND. This puts the memory keyer in the play mode. Press the desired MEMORY ADDRESS button.
2. The LED indicates memory is in operation. MEMORY ADDRESS resets message to the beginning once it is pressed.
3. To interrupt a playing message or to make an insertion, simply send at the point where changes are to be made. The message can be continued by pressing another MEMORY ADDRESS button which contains the remainder of the message.
4. To repeat, turn the function Switch to the REPEAT Position, then press the same MEMORY ADDRESS button. The recorded message will repeat continuously until it is interrupted. NOTE: The repeat function will repeat both messages and any length of space at the end of a message. Recording a pause at the end of a message will allow you to listen before the message is repeated again.

## OPERATION NOTES

1. Shielded cables must be used between the key and the memory keyer jack and between the keyer output and the transmitter to prevent RF interference.
2. If an unwanted dot should appear at the beginning of a recorded message, press the desired MEMORY ADDRESS button two or three times in the record mode before programming.
3. Cover the battery snap if memory saver battery is not in use. Use the plastic tubing provided.
4. Use only the MFJ AC adaptor supplied. Do not use more than 15 volts for the external battery. The tip of the sub miniature jack is positive and the sleeve is ground.

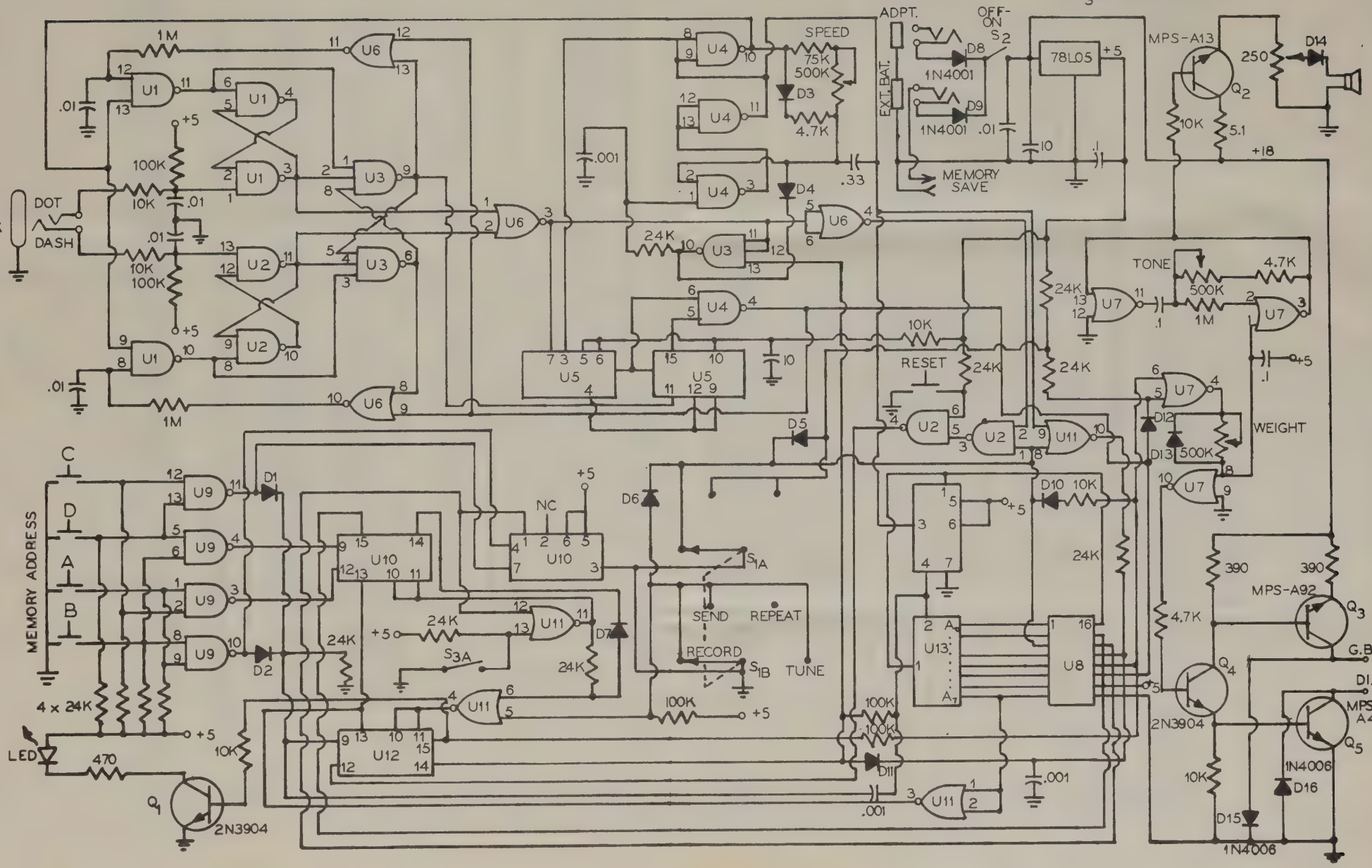



| | |
|---|---|
| U1 | 4011 |
| U2 | 4011 |
| U3 | 4023 |
| U4 | 4011 |
| U5 | 4027 |
| U6 | 4001 |
| U7 | 4001 |
| U8 | 2102 |
| U9 | 4011 |
| U10 | 4027 |
| U11 | 4001 |
| U12 | 4027 |
| U13 | 4024 |

**MFJ-482 COMPONENTS LOCATION DIAGRAM**

# MFJ-482 SCHEMATIC DIAGRAM

NOTE: ALL CAPACITORS IN MICROFARADS.
ALL RESISTORS IN OHMS.
UNLESS NOTED DIODES ARE 1N4148.
$S_3$ SHOWN AS PUSHED IN.



## FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for **$4.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a **$4.00** personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is delivered prepaid. All charges will be shipped COD to the owner.
9. This warranty is given in lieu of any other warranty express or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvement in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 921A Louisville Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

# MFJ Deluxe Iambic Paddle
## Model MFJ-564

Thank you for purchasing the MFJ-564 Deluxe Iambic Paddle. It is designed to work with any iambic keyer. The MFJ-564 has two contacts on the bottom of the base, one for dots and one for dashes. Connections are made to the solder lugs on the split posts and to the bottom of the base for ground. Use a shielded cable for connections.

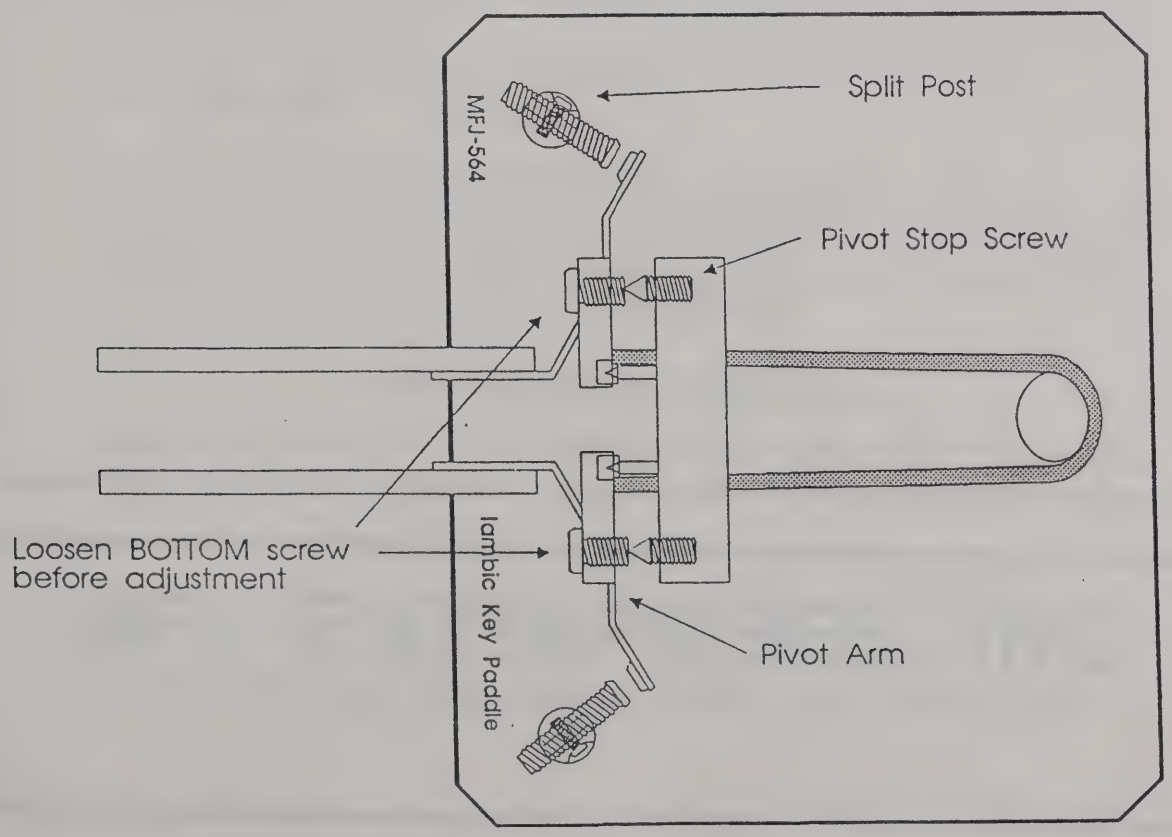
After connecting the paddle to your keyer, adjustments are simple. There are two adjustments that you may make:

**Before adjustment, you must loosen the bottom screw on each of the pivot arms until the pivot arms are free when squeezed. See figure below. These screws were tightened for shipping.**

1. Spacing of the contacts is adjusted by loosening the set screws in the split posts with a standard philips screwdriver and turning the contacts in or out with your fingers. Retighten the set screws after adjustment.

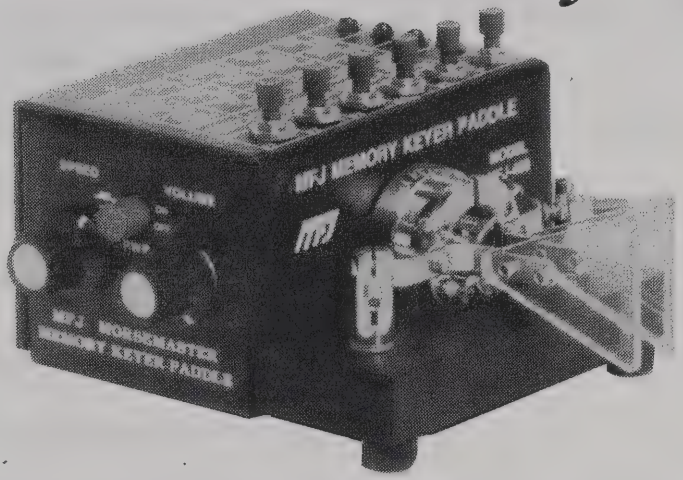
2. The throw of the paddles is adjusted by changing the length of the pivot stop screws through the back of the square block. The stop screws adjust how far the paddle arm falls back from the contacts.

Your paddle should need no oiling or cleaning. The nylon and steel needle bearings are self-lubricating and self-adjusting. The contacts should require no maintenance. If cleaning is determined necessary, lightly pull a piece of paper between the contacts to remove dust. Never use abrasive material to clean the contacts.



# MFJ-490/490X

## *Menu Driven Memory Keyer* ™




The MFJ-490/490X *Menu Driven Memory Keyer*™ is a full featured memory keyer with an easy to use menu driven interface. The model MFJ-490 is a keyer and Bencher paddle combination. The MFJ-490X keyer installs on your own MFJ-564 or Bencher type paddle. This unit has four soft sectored message memories for a total of 192 characters. The keyer can repeat messages continuously, insert timed pauses within messages, insert an auto-incrementing serial number, and have messages call other messages.

The MFJ-490/490X has adjustable controls for speed and volume on the front of the unit. Also, the speed, weight, and sidetone frequency are adjustable through menu selection or paddle command. Other modes such as Hand Key, Semi-auto, Reverse Paddle, Iambic On/Off, Iambic A/B, and Queue, are accessed through menu selection or paddle command. The MFJ-490/490X has an output configurable to either Direct or Grid-Block output.

## INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment


# MFJ ENTERPRISES, INC.

P.O. BOX 494, MISSISSIPPI STATE, MS 39762, USA


VERSION 1.0

COPYRIGHT © 1993 MFJ ENTERPRISES, INC.

# MFJ-490/490X *Menu Driven Memory Keyer*™

## FEATURES

**Memories:**
Four soft sectored message memories for a total of 192 characters

**Morse Code Trainer:**
Random code generator with 5 character or random 1-8 character length words. Random characters are selectable from alphabetic, numeric, or punctuation sets or specific 6 character sets.

**Embedded Commands:**
Auto-incrementing serial numbers, Timed pauses up to 99 minutes 99 seconds, Message loop, Linked messages, Message insertion.

**Adjustable Parameters:**
Code speed is variable from 5 to 100 WPM, weight varies from 5 to 95 %.

**Parameter Save:**
Message memory and keyer parameters saved in nonvolatile memory.

**Sidetone Speaker:**
Internal sidetone speaker with adjustable volume and frequency.

**Output Tune Mode:**
Constant key to tune tuners or antennas

**Key Output Disable:**
Enable and disable key output to practice operation.

**Keying Modes**
Iambic On/Off, Iambic A or Iambic B, Hand Key (straight key), Semi Auto (bug), and Reverse Paddle modes are user selectable.

**Positive or Negative Key Output:**
Supports both positive and negative keyed radios.

**Transmitter Compensation:**
Adjustable key down delays to compensate for transmitter rise-time delays.

## CONNECTIONS

The MFJ-490/490X *Menu Driven Memory Keyer*™ requires a 12 VDC 250 milliamp power supply. The power jack accepts a 2.1mm coaxial plug with the center conductor positive. An optional DC supply, the MFJ-1312B, is available from MFJ. Connect your MFJ-1312B Power Adapter or compatible DC supply (coaxial line with shield ground) into the power jack on the MFJ-490.

This unit can also be powered with a nine volt battery. See the section on battery installation.

The MFJ-490/490X supports both positive and negative keyed radios but is set to work as a **Direct** key output (most solid state radios). If your radio has a **Grid Block** key input (most radios with tube finals) you must change a jumper setting. Refer to the section on installation for the jumper change. Connect a quality standard shielded RCA cable between your radio key input and the MFJ-490's output.

## INSTALLATION

If you purchased a MFJ-490X (keyer without paddle) you must install it onto your paddle. Follow these instructions for installing a MFJ-490X onto a MFJ-564 or Bencher type paddle.

1. Remove any cables from the paddle. Do not apply power to unit while it is disassembled.
2. Remove the rubber foot from the bottom rear of the paddle. When you replace the screw from the foot, use one of the screws supplied in the installation kit.
3. Remove the plastic cable clamp from the bottom center of the paddle.
4. If you wish to use a nine volt battery, install one now. A nine volt battery fits in the bracket sideways over the circuit board. MFJ suggests the use of a good long-life alkaline battery for longest operation.
5. If your radio uses **Grid Block** key input you must change a jumper inside the keyer. A header is located in the rear of the unit between the CPU and the RCA jack. The jumper should be moved to the two rightmost pins (closest the RCA jack).
6. Slide the MFJ-490X on to the back of the paddle. Thread the cable through the slot on the left bottom of the MFJ-490X. Secure the case with the bumper and new screw. The MFJ-564 Iambic Paddle has 4 additional holes to better secure the case to the paddle.
7. Connect the cable shield to the middle rear terminal on the bottom of the paddle. The red wire should connect to the dash solder lug. The white wire should connect to the dot soldier lug. The wires should be as short as possible to minimize RFI.
8. Place the cable in the plastic cable clamp and secure the screw. Fold any excess cable up into the unit.

## BASIC OPERATION

The *Menu Driven Memory Keyer*™ is simple to operate. The push-button marked **PWR** controls power to the unit. After turning the unit on, the keyer will light the four LEDs sequentially and send the characters "O" and "N" in Morse Code using the sidetone speaker. This tells you the MFJ-490X is ready for operation.

Start sending with the paddle. Adjust the volume and speed to your preference. If the speed is still too fast or too slow, adjust the range of the speed knob using the Speed Set feature. See Menu Operation.

**Factory Reset**

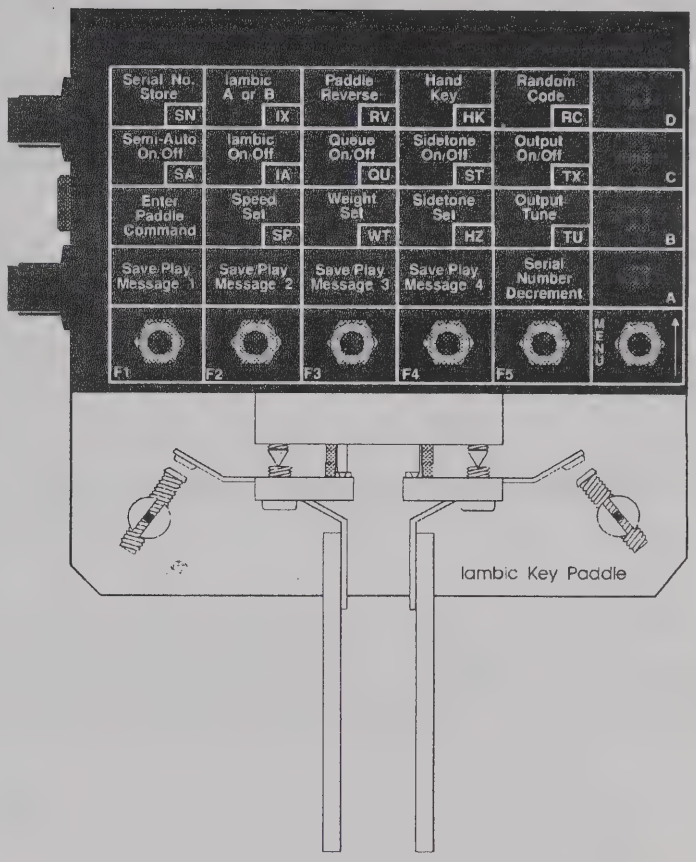
To reset the keyer to default settings, the **MENU** key is held down through power-up. This resets all settings to the factory default:

| | |
|---|---|
| All memory messages are cleared. | Speed set to 20 WPM. |
| Weight set to 50% duty cycle. | Sidetone frequency set to 2000 Hz. |
| Iambic A mode selected. | Queue mode off. |
| Break mode off. | Output enabled. |

If the keyer is turned on in the normal mode (without the **MENU** key held down), it will retain all settings prior to power down.

## MENU OPERATION

The MFJ-490/490X menu system consists of a menu button marked **MENU**, five function buttons marked **F1-F5**, and four menu LEDs marked **A-D**. Pressing the **MENU** key changes the menu level. The keyer will sound an audible key click and light the Menu LED of the new level. The row of boxes beside that LED now contains the functions of keys **F1-F5**.




For example, to enable the Tune (key down) function, look for the box marked Output Tune on the front panel. It is found on Row B under the column F5. Press the **MENU** key until the LED marked **B** lights up. Then press the **F5** key. The keyer will respond by entering the Tune mode. Squeeze the paddles to exit that mode.

### Menu A

**Message Memory**

To play or save to a message memory, select Menu A. To save a message to memory, press and hold the function key until the keyer plays "GO" in Morse code. You may now key in the message of your choice. As you pause after every word, the keyer will play a "W" over the sidetone speaker to show that it is inserting a word break. If the keyer does not recognize your code as a valid character, the keyer will play a series of 8 dots and that character will not be saved. If you make a mistake entering a word, you can back up over it by keying in 8 continuous dots. The keyer will erase the previous word, then play the word before it (if any) to let you know where you stopped. At the end of your message hit the memory function key again to end your message. The keyer will respond by sending an end of message character (+). If you try to save more characters than you have memory, the keyer will automatically end your message, send you an end of message character and lock any unused messages. To play a message, press and release a function key quickly.

**Embedded commands:**

While in the save message mode you may use embedded commands for special features. To use an embedded command simply store the two character, embedded command code within your message.

/N Inserts a serial number into a message. All nines are sent as "N" and zeros are sent as "T". A serial number is automatically incremented each time it is sent. To decrement the serial number, press the serial number Decrement menu button. A new serial number can be saved by using the serial number store menu feature.
Example: YOU ARE CONTACT NR /N

/L Create a message loop. ( Message Repeat )
Example: BEACON AA5MT 5 W /L

/P Inserts a timed pause into a message. This command is followed by 4 numbers in xx minutes xx seconds format. May be in either / Pxxxx or /Pxxxx format.
Example: TIMEOUT 1 HOUR /P6000 TIMEOUT 1.5 MIN / P0090 TIMEOUT 1 H 40 MIN 39 S / P9999

/# # = 1, 2, 3, 4 Insert's memory message number # into message. ( Message Call ) This command allows you to include any other message into another message. ***A message may not call any other message that contains an embedded message call.*** If no message is saved for that number nothing will play at the /#.
Example: message 1: CQ CQ CQ CQ
message 2: /1 DE KB5VKY
Sending message 2 plays CQ CQ CQ DE KB5VKY

/S Can be added into messages to insert an extra word space.

// To store a / in a message you must use the embedded command //.

Commands can be combined into messages:
FOXHUNT DE AA5MT /S /S /S BEACON WILL REPEAT 5 MIN DE TRANSMISSION NR /N /S /S /S CATCH ME IF YOU CAN /P 0500 /L

**Serial Number Decrement**

Use Serial Number Decrement to decrement the current serial number by one. The unit will echo a "D" for every number that is decremented. If you decrement down from zero you will get 9999 for your serial number. When a message plays 9999 the serial number will then increment to zero which does not play.

## Menu B

**Command Mode**

The first function on Menu B is the enter paddle command mode. After you push the function button **F1** the keyer will respond with "CO". Now a two or four character command can be entered on your paddle. If the instruction is invalid then the keyer will send 8 rapid dots (error) and return the keyer to normal mode. If the user wishes to re-attempt modifying features using command mode, he must re-enter command mode by pressing **F1** again.

All of the menu commands can also be accessed through the Command Mode using the two character shorthand found on the front panel. However, some features are not on the menu. A summary of those commands and a brief description of each feature follows:

**Command Mode Commands**

**BK** Use Break On/Off to toggle between break mode on and off. The keyer responds with the current mode "ON" or "OFF". Break mode allows you to insert code into a message that is playing. Press a dot or dash to break into a message. The keyer will stop the current memory message. Begin sending code. After you finish sending code, press any message button to resume playing the message where you interrupted it. Press **Menu** to clear a message.

**C#** Where #=0-9. Use character break to customize the length of the intercharacter spacing. A standard character break is 3 dot lengths long. The number following the C is the number of extra dot lengths added to a character break.

**Command Mode Commands (cont.)**

**FA** Use Farnsworth mode to toggle between Farnsworth mode on and off. Farnsworth mode works with the random code generator. It sets the code character speed to 18 words per minute while keeping the overall word speed at the defined setting. If the keyer is set to 5 WPM in Farnsworth mode, the keyer will send 18 WPM characters while inserting extra word break and intercharacter timing to maintain an effective speed of 5 WPM. At speeds above 18 WPM the keyer reverts to normal timing. This feature allows a user to associate Morse characters with their sound rather than by counting dots and dashes.

**KC##** ##=00-15 sets a keying compensation value. Some radios have a key delay of 5 mS or more. By entering KC05, the keyer will add 5 mS to the dots and dashes. This eliminates the problems with a keying delay

**R#** Where #=1-8. Use Random Number to customize the Random Code Generator. The keyer will play "OK" after your command has been entered.

R1: Enable either 5 character word length or random (1-8 character) word length.
R2: Toggle random numeric characters on and off.
R3: Toggle random punctuation characters on and off.
R4: Toggle random prosign characters on and off.
R5: Toggle random alphabetic characters on and off.
R6: Enable either fixed character sets (01 - 09) or enabled sets (R2 - R5). See ## command.
R7: Enable either repeat code session or new code session.

**W#** Where #=0-9. Use word break to customize the length of the interword spacing. A standard word break is 7 dot lengths long. The number following the W is the number of extra dot lengths added to a word break. Keyer echoes "OK" upon entry.

**##** ## = 00 - 09. Select one of the six character sets for the random code generation. Keyer echoes "OK" upon entry.

| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 |
|---|---|---|---|---|---|---|---|---|
| A | G | M | S | Y | 4 | . | _ | ; |
| B | H | N | T | Z | 5 | ? | + | ( |
| C | I | O | U | 0 | 6 | " | , | ) |
| D | J | P | V | 1 | 7 | $ | - | / |
| E | K | Q | W | 2 | 8 | ' | = | Start |
| F | L | R | X | 3 | 9 | Para | : | Invite |

**Speed Set (SP)**

Use Speed Set (wpm) mode to change the speed of code . An alternating dot/dash is produced and the speed is modified by using the paddles to increase/decrease speed. Squeeze paddles to exit.

**Weight Set (WT)**

Use Weight Set to modify the weight settings for code. An alternating dot/dash is produced and the weight of the code is modified by using the paddles to increase/decrease weight. Squeeze paddles to exit.

## Menu D

**Serial No. Store (SN)**

Use Serial Number Store to set the current serial number. You must enter four numbers in Morse code for a valid serial number. All numbers must be in the proper Morse code format. For example, the number "1" must be ".----" and the number "0" must be "-----". The serial number can be set from 0000 to 9999. See /N under Embedded Commands. See also Serial Number Decrement.

**Iambic A or B (IX)**

Use Iambic A or B to toggle between Iambic A and Iambic B. The keyer responds with the current mode "A" or "B". The Iambic modes work when you squeeze both paddles together. See Iambic On/Off. In Iambic B mode the keyer plays the alternating element after the paddles are released during an element. Iambic A mode does not produce an alternating element when the paddles are released during an element. For example, a release during the dash produces ".-" or "A" in Iambic A mode but produces ".-." or "R" in Iambic B mode.

**Paddle Reverse (RV)**

Use Paddle Reverse to change the dot/dash paddle assignments. The keyer responds with "RV" and changes the dot paddle to dash and the dash paddle to dot.

**Hand Key (HK)**

Use Hand Key to use your paddle as a hand (straight) key. The keyer responds with "HK". Dots and dashes are made manually by using either key of the paddle. Squeeze paddles to exit.

**Random Code (RC)**

Use Random Code to start the random code generator. Set up the Random Code generator using the Command Mode. Use FA, R1-8 and the set selection numbers to customize your code tutor to select exactly what you need to study. Squeeze paddles to exit.

## TYPICAL SETTINGS FOR A CONTEST

This is an example of some typical settings for a contest. Each contest has different rules for exchanges etc. and you may have a different method of contesting. This is an example of one contester's settings.

Memory #1: CQ TEST DE W8JI W8JI W8JI TEST
Memory #2: TEST W8J1 W8JI
Memory #3: UR 599 SN /N OH DE W8JI
Memory #4: R 73 TEST W8JI

Memory #1 is set for CQ at slow periods or at the end of a contest when most stations have already been worked.

Memory #2 is set for busy times when contacts are plentiful. Each of these memories are set with simple to the point messages. A listener will immediately know who is calling and what they want. The call is repeated after a short CQ TEST so that someone will not spend much time listening to stations they have already worked.

Memory #3 is set with the contest exchange. It gives a serial number and other contest information. Remember, all contests require different exchanges.

Memory #4 is set to close a QSO and announce that you are ready to for another contact.

## TYPICAL CODE PRACTICE SESSION

This is an example of a typical code practice session. Work first on the letters A-F. You can do all our practice in Farnsworth mode so that you will learn the sound of each character at a high speed.
Enter Command Mode and key in 'FA'. This enters Farnsworth mode.
Now fix the code generator to the 6 character sets by entering R6.
Enter '01' in the Command Mode to choose the A-F character set. The default settings are set to fixed 5 character length and repeat session.
Now adjust the speed with the speed set feature. Remember you are in Farnsworth mode so you can only adjust word spacing. All character speed is set to 18 words per minute.
Get ready to copy.
Press the Random Code Function key and take code for a couple minutes. When you get to a stopping point squeeze the paddles together to end the session.
Restart the session again by pressing the Random Code Function key. The code session will start again and you should be able to check your copy. The same code session will repeat until you turn off the power or toggle the R8 command in the Command Mode.
After you have practiced the A-F set you can move to the next set by entering 02 - 08 in the command mode.

## BATTERY REMOVAL AND INSTALLATION

The MFJ-490 has two batteries. An optional nine volt for operation and a lithium cell for memory backup. MFJ suggests the use of a good long-life alkaline nine volt battery for longest operation. Turning the sidetone "off" will conserve the nine volt battery as the speaker pulls more current than any other keyer component. The lithium cell on this keyer should last 2 years or more.

To replace the nine volt battery do steps **1-4**, **14**. To repace the lithium cell do all steps ***except*** **4**.

1. Remove the rubber foot from the bottom rear of the paddle. Remove all extra screws from the paddle if you have an MFJ-564.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Slide the keyer off the paddle
4. If you are ***not*** installing a lithium cell install a nine volt battery now. A nine volt battery fits in the bracket sideways over the circuit board. Go to step 14.
5. Remove the wires to the paddle by removing the solder lugs from the paddle. This will make things easier but it will not be necessary.
6. Remove the knobs with a 1/16 Allen wrench. Remove the nuts from the pots.
7. Remove the two large headed screws from the corners of the top of the keyer.
8. Grasp the half of the keyer shell with the speaker and slide it out of the shell with the buttons.
9. Lay the 2 halves of the shell flat so that the speaker wire is not flexed.
10. Locate the lithium cell battery holder under the PCB. ***Turn the power switch to the "ON" position.***
11. With a small flathead screwdriver lever the lip of the lithium cell forward over the edge of the battery holder. Lever the cell sideways out of the holder.
12. Hold the battery clip up with the small screwdriver and slide the new battery sideways under the battery clip. Remove the screwdriver and slide the cell into place.
13. Slide the 2 halves of the keyer back together and reinstall the screws, pot nuts, and knobs.
14. Slide the keyer back on the paddle and replace the screws. Reconnect the solder lugs if you removed them. Replace the plastic cable clamp and rubber foot.

## COMMAND MODE QUICK REFERENCE

| COMMAND | | DESCRIPTION |
|---|---|---|
| BK | | TOGGLES BREAK IN MODE ON/OFF |
| C# | # = 0-9 | SELECTS CHARACTER BREAK LENGTH |
| FA | | TOGGLES FARNSWORTH MODE ON/OFF |
| HK | | ENABLES HAND KEY (STRAIGHT KEY) MODE |
| HZ | | ENABLES SIDETONE FREQUENCY SET MODE |
| IA | | TOGGLES IAMBIC MODE ON/OFF |
| IX | | TOGGLES IAMBIC MODES A/B |
| KC## | ## = 00-15 | SELECTS KEYING COMPENSATION VALUE |
| QU | | TOGGLES MESSAGE QUEUE MODE ON/OFF |
| RA | | ENABLES RANDOM CODE MODE |
| RV | | TOGGLES DOT/DASH PADDLE ASSIGNMENTS |
| R# | # = 1-8 | SELECTS RANDOM CODE MODES |
| SA | | ENABLES SEMI-AUTOMATIC (BUG) MODE |
| SN | | ENABLES SERIAL NUMBER STORE MODE |
| SP | | ENABLES SPEED (WPM) SET MODE |
| ST | | TOGGLES SIDETONE ON/OFF |
| TU | | ENABLES TUNE (KEY UP) MODE |
| TX | | TOGGLES OUTPUT KEY ON/OFF |
| WT | | ENABLES WEIGHT SET MODE |
| W# | # = 0-9 | SELECTS WORD BREAK LENGTH |
| ## | ## = 01-09 | SELECTS RANDOM CODE 6 CHARACTER SETS |

## TECHNICAL ASSISTANCE

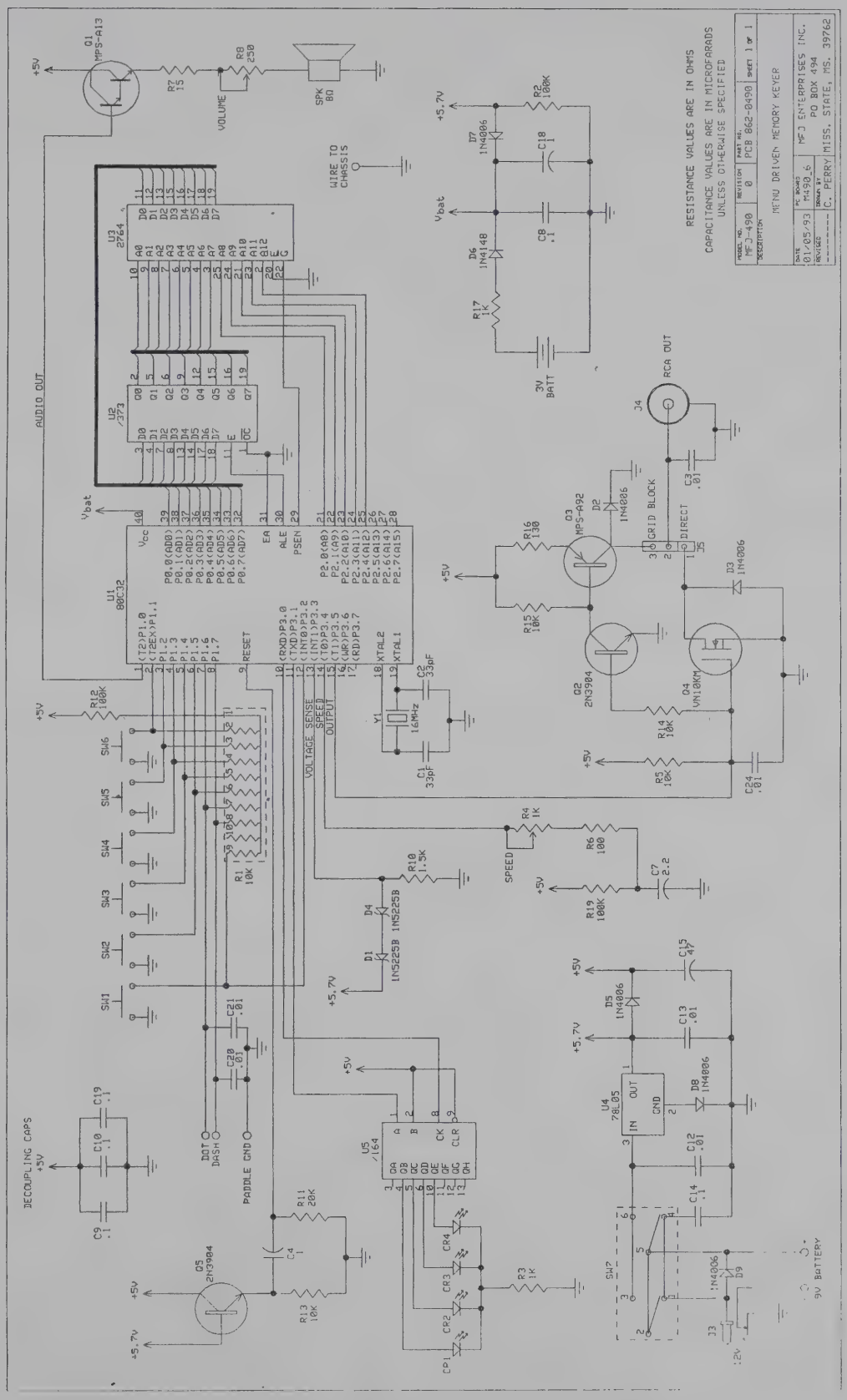
If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by following the manual you may call MFJ toll-free at 1-800-647-TECH (8324) or FAX to 601-323-6551, or TELEX 53 4590 MFJ STKV. Outside the continental U.S.A. 601-323-5869. You will be best served if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions to MFJ Enterprises, INC., P.O. Box 494, Mississippi State, MS 39762. Send a complete description of your problem, an explanation of exactly how you are using your unit and a complete description of your station.

## MFJ-490 PARTS LIST

| Part Designator | Part Description | MFJ Part Number |
|---|---|---|
| R1 | RESISTOR, NETWORK, SIP, COMMON, 9 ELEMENTS, 10K | 126-4100-09 |
| R2,R12 | RESISTOR, 1/4 WATT, 5%, FILM, 100K OHM | 100-5100 |
| R3,R17 | RESISTOR, 1/4 WATT, 5%, FILM, 1.0K OHM | 100-3100 |
| R4 | RESISTOR, POT, PCB, LINEAR TAPER, 1K | 162-3100-1 |
| R6 | RESISTOR, 1/4 WATT, 5%, FILM, 100 OHM | 100-2100 |
| R7 | RESISTOR, 1/4 WATT, 5%, FILM, 15 OHM | 100-1150 |
| R8 | RESISTOR, POT, PCB, LINEAR TAPER, 250 OHM | 162-2250-1 |
| R10 | RESISTOR, 1/4 WATT, 5%, FILM, 1.5K OHM | 100-3150 |
| R11 | RESISTOR, 1/4 WATT, 5%, FILM, 20K OHM | 100-4200 |
| R13,R14,R15,R19 | RESISTOR, 1/4 WATT, 5%, FILM, 10.0K OHM | 100-4100 |
| R16 | RESISTOR, 1/4 WATT, 5%, FILM, 130 OHM | 100-2130 |
| C1.C2 | CAPACITOR, MULTILAYER CER., NPO, 5%, 50 V, 33 PF | 205-0020 |
| C3,C12,C13,C20,C21,C24 | CAPACITOR, DISC CERAMIC, 1 KV, 20%, .01 UF | 200-2015 |
| C4,C18 | CAPACITOR, ELECTROLYTIC, RADIAL, 50V, 1 UF | 203-0006 |
| C7 | CAPACITOR, ELECTROLYTIC, RADIAL, 35V, 2.2UF | 203-0002 |
| C8,C9,C10,C19 | CAPACITOR, MULTILAYER, .2, X7R, 10%, 50V, .1 UF | 205-2210 |
| C14 | CAPACITOR, DISC CERAMIC, 1 KV, 20%, .1 UF | 200-2017 |
| C15 | CAPACITOR, ELECTROLYTIC, RADIAL, 35V, 47 UF | 203-0007 |
| Q1 | TRANSISTOR, TO-92, NPN, MPS-A13 | 305-2007 |
| Q2,Q5 | TRANSISTOR, NPN, MOT 2N3904 | 305-0018 |
| Q3 | TRANSISTOR, TO-92, 300V,PNP, MPS-A92 | 305-2006 |
| Q4 | TRANSISTOR, FET, SWITCHING, VN10KM | 305-6005 |
| Y1 | CRYSTAL, HC18/U, 16 MHZ | 405-0067 |
| D1,D4 | DIODE, ZENER, DO-35, 500 mW, 3V, 1N5225B | 301-5225 |
| D2,D3,D5,D7,D8,D9 | DIODE, RECTIFIER, DO-41, 1 A, 800 PIV, 1N4006 | 300-1005 |
| D6 | DIODE, SWITCHING, DO-35, 10 mW, 75 PIV, 1N4148 | 300-0003 |
| CR1 | LLT, OPTO, LED, 5MM, ROUND, GREEN | 320-0002 |
| CR2,CR3,CR4 | LLT, OPTO, LED, 5 MM ROUND, RED, MV5753 | 320-0001 |
| IC1 | IC, CPU, 40 Pin, 8-BIT, INTEL, P80C32-1 | 313-08032 |
| IC2 | IC, HCT 20 Pin, TRI-STATE OCTAL LATCH, 74HCT373 | 310-4373 |
| IC3 | IC, EPROM, 28 PIN, 64K, 21V, CMOS, 27C64 | 312-2081 |
| IC4 | VOLTAGE REGULATOR, +5 VOLTS, 78L05AC | 307-0010 |
| IC6 | IC, HC, 8 BIT SHIFT REGISTER, OUT, 14 PIN, 74HC164 | 310-3164 |
| J3 | JACK, 2.1 MM, PCB, DC COAXIAL JACK | 601-6021 |
| J4 | JACK, RCA PHONO, PCB, SINGLE | 600-0011 |
| J5 | CONNECTOR, JUMPER, SHORTING, .1, 2 POSITION | 612-4001 |
| B1 | BATTERY, COIN, 3V, LITHUM, (1480), | 730-1308 |
| FOR B1 | HOLDER, BATTERY, PCB MT, COIN, 3 V, LITHUM | 730-2293 |
| SPKR | LLT, SPEAKER, 2", ROUND, .2 WATT, 8 OHM | 410-0024 |
| SW1 - SW6 | SWITCH, PUSH BUTTON, 3 AMP, 125 VAC, SPST | 504-1003 |
| SW7 | SWITCH, PUSH-BUTTON, PC, .5 A, 125 VAC, 2P2P | 504-0022 |
| FOR SW7 | KNOB, PLASTIC, PUSH-BUTTON, .350" DIA, RED | 760-2140 |

# MFJ-490 SCHEMATIC DIAGRAM



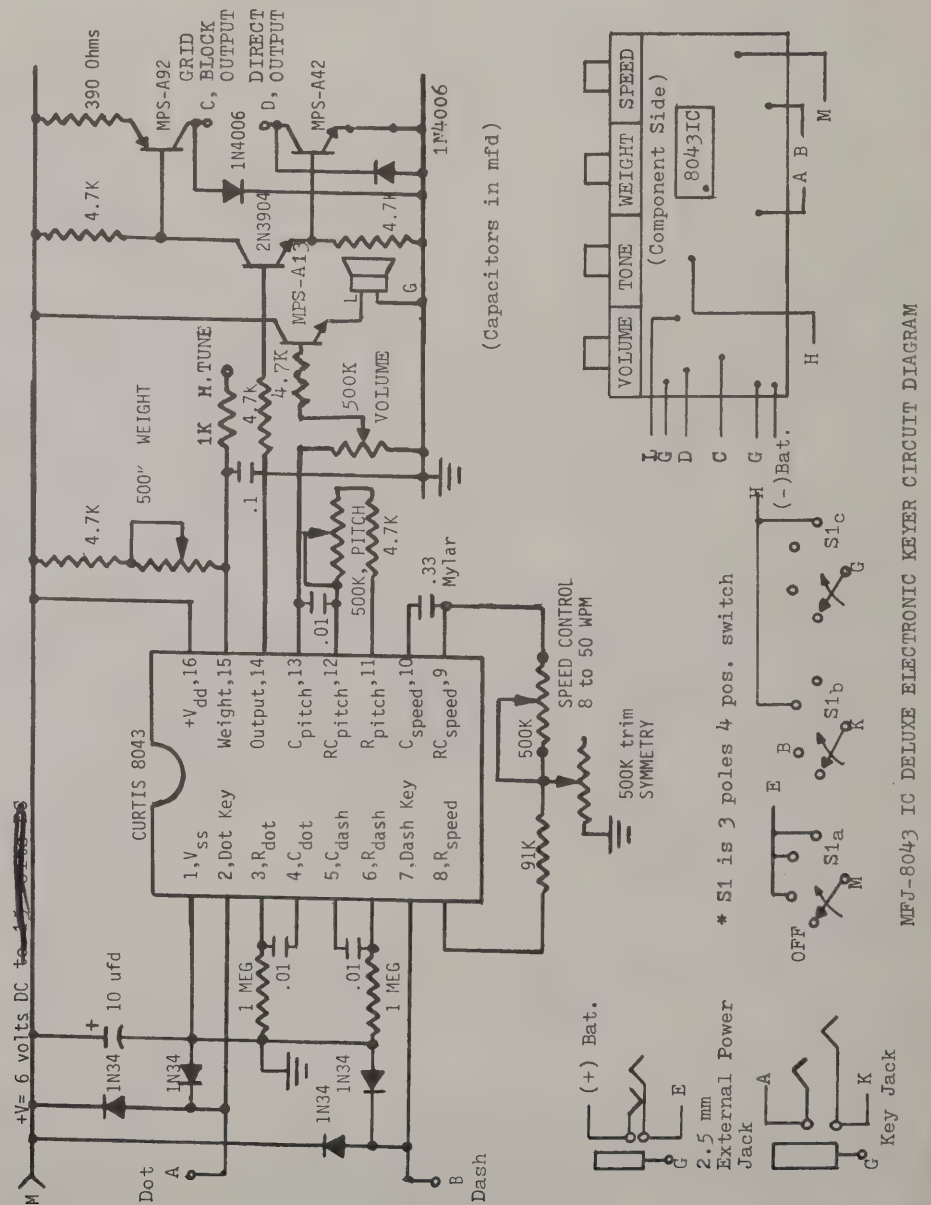
## MFJ-8043 IC DELUXE ELECTRONIC KEYER OPERATIONAL HINTS

Thank you very much for your purchase of the new MFJ-8043 IC Deluxe Electronic Keyer.

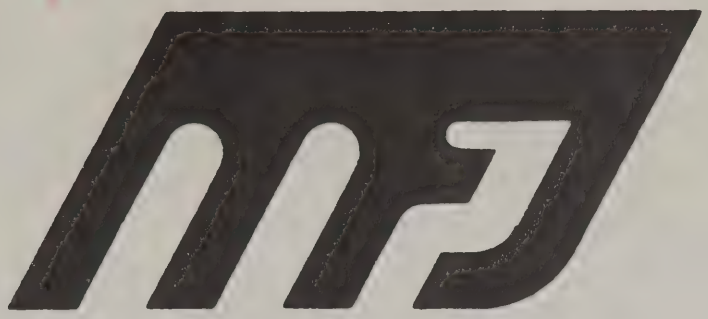
This new MFJ-8043 IC keyer uses the most advanced IC, Curtis 8043, ever developed strictly for ham use. The MFJ-8043 IC is a highly sophisticated keyer having advanced electronic features, surpassing ANY other keyers in this price range.

The following are some operational hints that you may find useful.

1. Remove the two screws near the rear top. Slide the cover toward the rear and remove the cover. Install 4 "C" cell batteries in the holder. Observe proper polarity. You may also use a 6 VDC [redacted] battery eliminator. Use an eliminator with a 2.5 mm plug. When external power is used the battery is automatically disconnected. Note that the tip of the plug is positive.
2. A new reliable solid state keying circuit allows keying of all grid block, cathode, and solid state transmitters. For grid block keying use the "Grid Block" keying output. For cathode keyed and solid state transmitters use the "Direct" keying output. The "Grid Block" output keys a maximum negative voltage of 300 volts to ground at 10 ma. The "Direct" output keys a maximum positive voltage of 300 volts to ground at a maximum current of 200 ma.
3. The four position function switch on the front panel: The "TUNE" position keys your transmitter for tuning. The "OFF" position removes power from the keyer. The "ON" position is the normal operation. The "SEMI-AUTO" position allows semi-automatic "bug" and manual operations. It provides automatic dots and manual dashes. The keyer is completely manual if a straight key is used.
4. The Speed control allows 8 to 50 words per minute adjustment of code speed. Minimum speed is completely counter clockwise.
5. The Weight control allows lengthing of the dots and dashes for more CW punch and gives your signal a characteristic sound. Do not use too much weight at high speed. If a continous tone is heard when on "ON", this means that too much weight is used for that speed. The Weight control or Speed control must be reduced.
6. The Tone and Volume controls can be adjusted for most pleasing tone and volume. Turn the Volume control completely counter clockwise to eliminate the sidetone.
7. For fully automatic operation, set the function to "ON". A squeeze or single lever key can be used. We recommend the MFJ squeeze key. Squeeze key allows IAMBIC operation. Use a standard quarter inch stereo phone plug and a three-conductor cable. The dot wire should connect to the ring of the plug, the dash wire to the tip and the third wire to ground. The dot insertion feature allows you to hold the dash side in and tap the dot side to insert a dot (without releasing the dash side).
8. For semi-automatic "bug" or manual operation, set the function switch to "SEMI-AUTO". A squeeze or single lever key can be used. The keyer will generate dots automatically and dashes manually. Use a standard quarter inch stereo phone plug and connect the three conductor cable as in step 6. When a straight key is used the MFJ-8043 IC becomes a manual keyer. It will safely key your transmitter and eliminate the shock hazard of high voltage being present on the straight key. Again a standard quarter inch stereo phone plug should be used. Connect one wire to the tip of the plug and another wire to ground. The ring of the plug should not be used.




MFJ-8043 IC DELUXE ELECTRONIC KEYER CIRCUIT DIAGRAM



# MFJ DELUXE ELECTRONIC KEYER

MODEL MFJ-407B

## OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


# MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-407B DELUXE ELECTRONICS KEYER

The MFJ-407B DELUXE ELECTRONICS KEYER uses the reliable Curtis 8044 ABM Keyer IC to make it easy to send perfect code.

## CONTROL FUNCTIONS

1. PWR SWITCH: This switch turns the unit ON and OFF.
2. SPEED CONTROL: Variable from 8 to 50 WPM.
3. WEIGHT CONTROL: When turned fully counter clockwise, dot-dash-space ratio is a perfect 1:3:1. Turn clockwise to increase or decrease dot and dash lengths depending on the WEIGHT Push Button setting.
4. WEIGHT INC/DEC: This switch determines whether the WEIGHT CONTROL will INCrease or DECrease the dot and dash lengths from the full counter clockwise position of the WEIGHT CONTROL.
5. SEMI-AUTO: Allows semi-automatic "bug" and manual operations. When a squeeze or single lever key is used the keyer generates dots automatically. Dashes are manually made. When a straight key is used, the keyer is completely manual.
6. TONE CONTROL: Set for the desired side tone pitch.
7. TUNE SWITCH: Keys your transmitter continuously for tuning.
8. VOLUME CONTROL: Adjust the loudness of the sidetone from the internal speaker.
9. IAMBIC A/B SELECT: Located on the back of the unit, this switch allows the choice of IAMBIC Type "A" or Type "B". Type "A" does NOT produce a following alternate element when a squeeze is released during a dot or dash. Type "B" does produce a following alternate element after squeeze release. For example, in Type "A", squeeze release during the "dah" in the letter A will produce just the A. In Type "B", squeeze release during the "dah" in the letter A will produce an R.

## INSTALLATION

1. To install a 9V transistor battery, remove the two screws on the side of the box.
2. An optional AC ADAPTOR (5-9V DC) may also be used. First plug the ADAPTOR into the subminiature jack on the rear panel and then plug the ADAPTOR into a 110V outlet. When the external power is used the batteries are automatically disconnected. Use an adaptor with a 2.5 mm plug. The tip of the plug should be positive.
3. A squeeze or single lever key can be used. Squeeze key allows IAMBIC operation. Use a standard quarter inch stereo phono plug and a two conductor shielded cable. If seperately shielded cables are used, tie the two shields together and connect them to ground. Connect the dot wire to the ring of the plug and the dash wire to the tip. When a straight key is used the MFJ-407B becomes a manual keyer. It will safely key your transmitter and eliminate the shock hazard of high voltage being present on the straight key. NOTE: To use a straight key, first switch the keyer to the SEMI-AUTO mode.

## FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

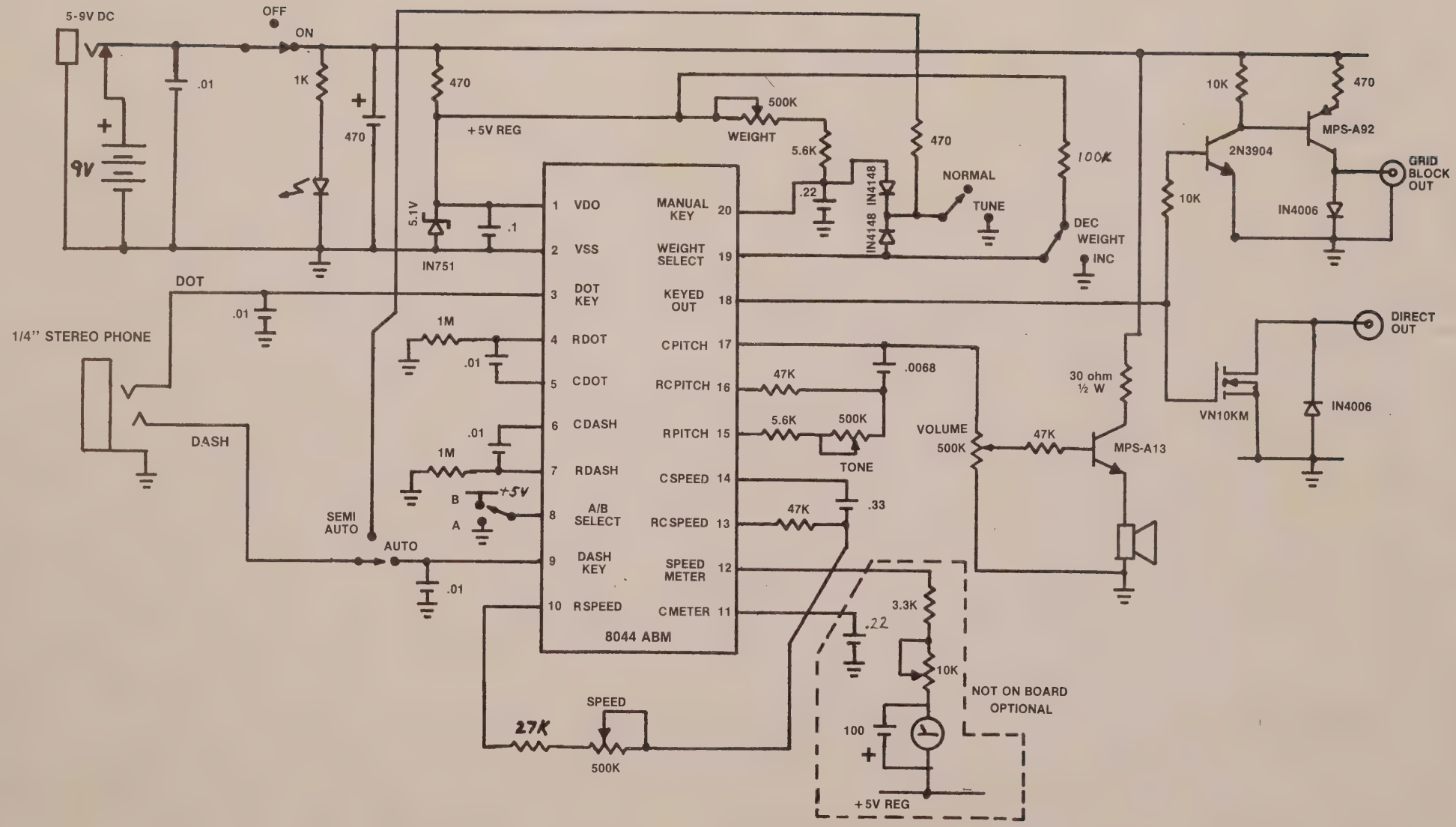
1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for **$4.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a **$4.00** personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is delivered prepaid. All charges will be shipped COD to the owner.
9. This warranty is given in lieu of any other warranty express or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvement in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 921A Louisville Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

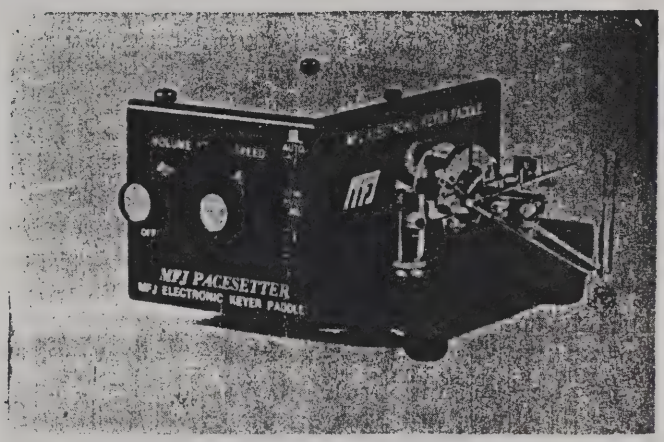
Again a standard quarter inch stereo phono plug should be used. (Mono plug will not work on a straight key on SEMI-AUTO mode.) Connect one wire to the tip of the plug and another wire to ground. The ring of the plug should not used.

## KEYER OPERATION

1. Install 9V battery or use an optional AC ADAPTOR to supply power to the keyer.
2. Plug in key paddle to KEY jack. A dual paddle squeeze key or a single lever key can be used.
3. Turn the Keyer ON and set the SEMI-AUTO switch to AUTO.
4. Start sending with paddle and adjust volume, tone, weight, and speed to your preference. NOTE:If a steady tone at high speed occurs, reduce the weight or the speed by turning the respective knob counterclockwise.
5. The dot and dash memories ease sending. It allows keying a dot before the completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash lever and then the dot lever before the completion of the dash. The keyer will provide both the dash and the dot. The dash memory can be checked in a similar manner. The dot insertion feature allows you to tap the dot lever while holding the dash lever in to insert a dot. The dash insertion feature allows you to insert a dash while holding the dot lever in. When using squeeze key and with both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. The first contact determines whether a dot or dash occurs first.
6. Select either IAMBIC A or B according to your preference.

# MFJ-407B SCHEMATIC DIAGRAM






With paddle

Without Paddle

Purchased 6/2/92
C.T. McKenzie - AF5TT
CK# 3319
Charlotte Hamilton

**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


# MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

WITH PADDLES WITH OUT PADDLES

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

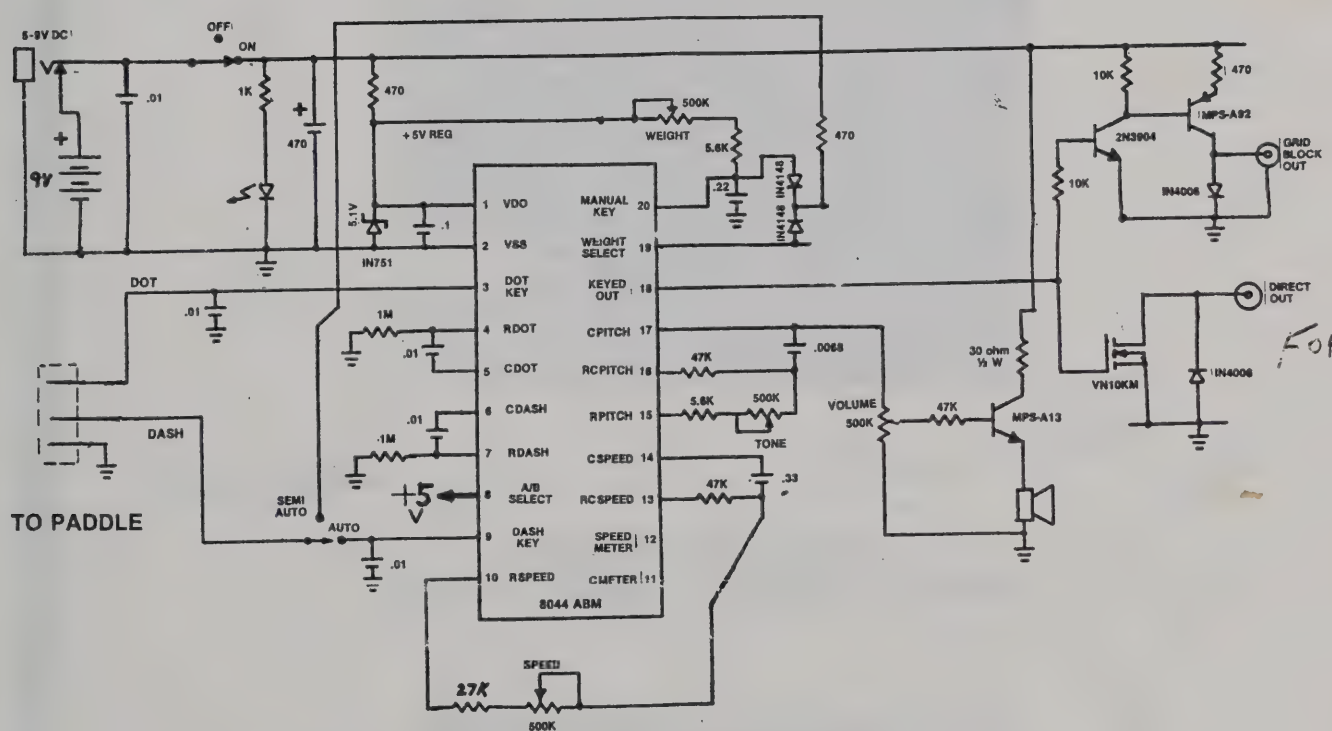
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

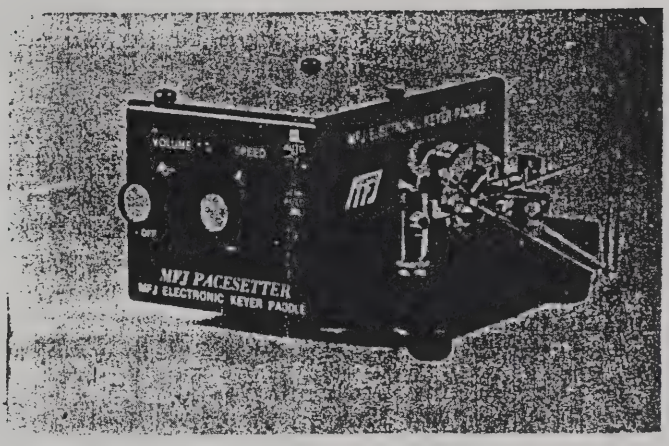
After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, redu

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**




With paddle

Without Paddle

Purchased 6/2/90
C.T. McClain - AA5TT
CK# 3319
Charlotte Harness

**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


# MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

WITH PADDLES

WITH OUT PADDLES

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

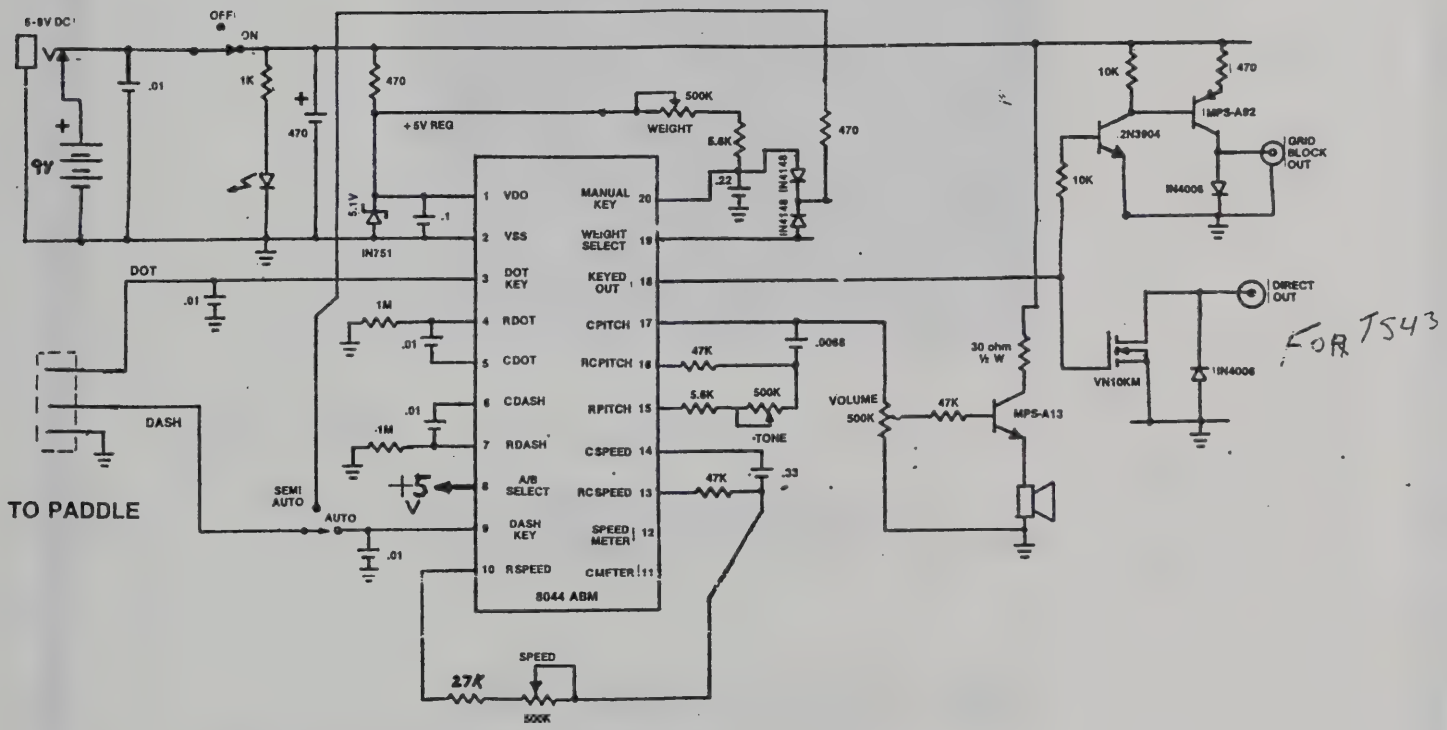
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, redu

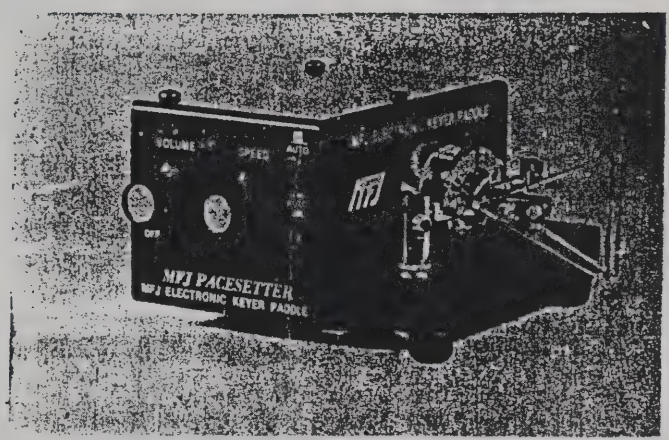
the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**

FOR TS43




With Paddle

Without Paddle

Purchased 6/2/90
C.T. McKenzie - AA5TT
CK# 3319
Charlotte Hamilton

**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


# MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

WITH PADDLES

WITH OUT PADDLES

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

## (MFJ-422B/422B-X)

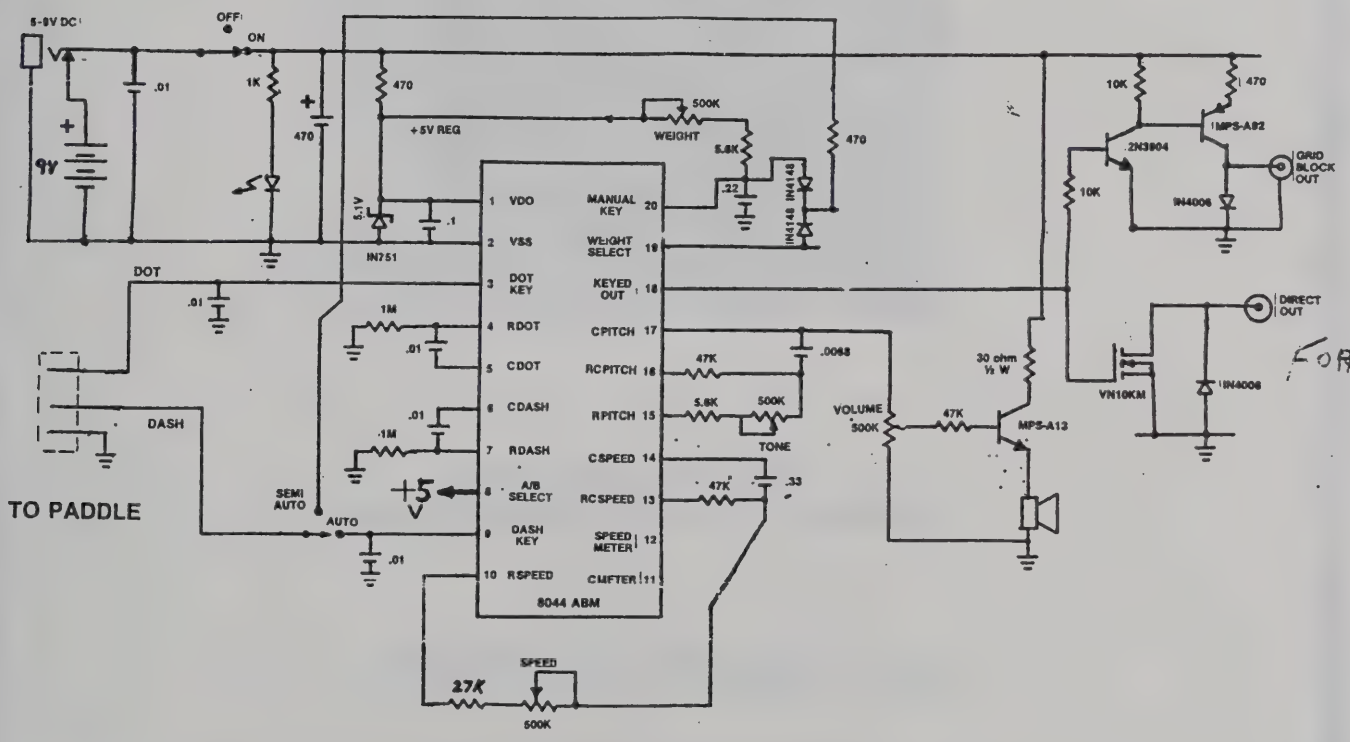
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

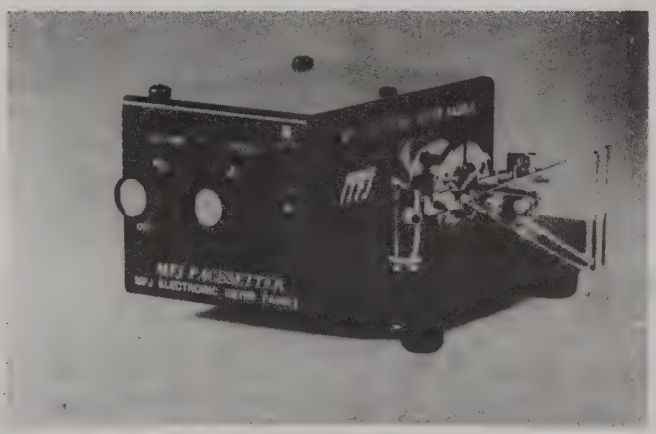
After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, redu

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**



**MFJ-422B/422B-X**
**ELECTRONIC KEYER PADDLE**

# OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


## MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-422B/422B-X INSTRUCTIONS

## INTRODUCTION

Thank you for your purchase of the MFJ-422B/422B-X Electronic Keyer. The MFJ-422B/422B-X is designed to mount on the "BENCHER" paddle resulting in a compact, one-piece Keyer/Paddle combination. The improved Curtis 8044 ABM Keyer IC is used in the MFJ-422B/422B-X to make perfect code transmission easy and pleasant. Controls are located for easy access while operating.

## CONTROLS

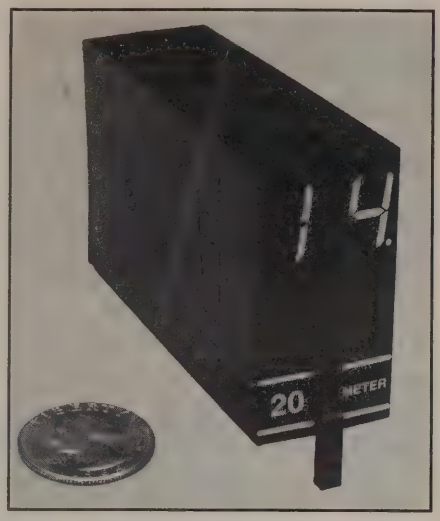
1. VOLUME: Adjusts the volume of the sidetone from the internal speaker. Functions as the power ON/OFF switch for the MFJ-422B/422B-X.
2. SPEED: Varies the sending speed from 8 to 50 WPM.
3. AUTO/SEMI-AUTO: AUTO-Normal operating position. Dots and dashes of the correct length are generated automatically. SEMI-AUTO-Dots are generated automatically. Dashes are manually made. (NOTE: In this position, when the dash paddle is held your transmitter is keyed continuously for tuning.)
4. TONE: Sets the pitch of the sidetones. This control is recessed inside the cabinet between the VOLUME and SPEED controls. A small flat head screwdriver is needed for adjustment.
5. WEIGHT: Adjusts dot and dash lengths. When turned fully counter-clockwise, dot-dash-space ratio is a perfect 1:3:1. This control is located on the rear of the cabinet and is also recessed. A small flat head screwdriver is necessary for adjustment. (NOTE: The weight control is factory set for a 1:3:1 ratio.)

## INSTALLATION

### FOR MFJ-422B (KEYER WITH PADDLE)

If you purchased the MFJ-422B (Keyer with Paddle), the keyer will come factory installed on the paddle and the only connections necessary will be to your transmitter and power supply if used.

If battery operation is desired, remove the rubber foot on the bottom rear of the paddle and screw holding the plastic wire clamp from the bottom center of the paddle. The keyer will now slide off the paddle base toward the rear . Install a 9V transistor battery in the battery snap and slip the battery into the holder. Reverse the above procedure to re-install the keyer onto the paddle. Feed the connecting cable through the slot on the bottom of the paddle and is clamped securely with the cable clamp. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)




*A plug-in module for the 20 meter band.*

cillator. This oscillator covers 2.2 to 2.7 MHz with a slight overrun. The output of this oscillator is mixed with a crystal oscillator and its output fed to the CPU. The microprocessor compares each frequency reading with the previous reading, and if a difference is in excess of a preset amount, it automatically corrects the PTO by means of a varactor.

## RIT

RIT (Receiver Incremental Tuning) is selected by the front-panel switch. The knob is positioned at 12 o'clock for no offset and can be turned clockwise or counterclockwise to help clarify received signals. The frequency display then reflects the change made by the RIT control. Range available is ±1 kHz.

## Circuit Description

The local oscillator from the band plug-in module is amplified to +10 dBm to serve both transmit and receive mixers. The received signal is first amplified by a 2N6519, and then the signal is mixed to the intermediate frequency (IF). The IF signal is then mixed with the local oscillator.

The RF amplifier, the 2N6519, is a noiseless feedback amplifier which provides an excellent noise figure. Ten-Tec has been producing what I consider to be very excellent, quiet, low-noise receivers, and the Scout is a good example of their engineering techniques. In my receiving tests I used four different popular transceivers, using the simple process of tuning in a signal and then switching receivers. My conclusion was clear cut: The Scout was outstanding compared to more expensive receivers. It has a very low noise floor, and what surprised me was that it was as good as or better than the other rigs, considering the low price range. In simple language, it is a doggone good piece of equipment.

What about selectivity? There are two crystal filters in the set. One is a four-pole, variable-bandwidth filter (the Ten-Tec Jones filter) which is adjustable from the front panel, and the other is a fixed, five-pole bandwidth filter. The fixed bandwidth filter also has a notch at the BFO frequency to improve the unwanted sideband rejection. Some of the above may be confusing to a non-technical amateur. However, there is one simple test I like to make.

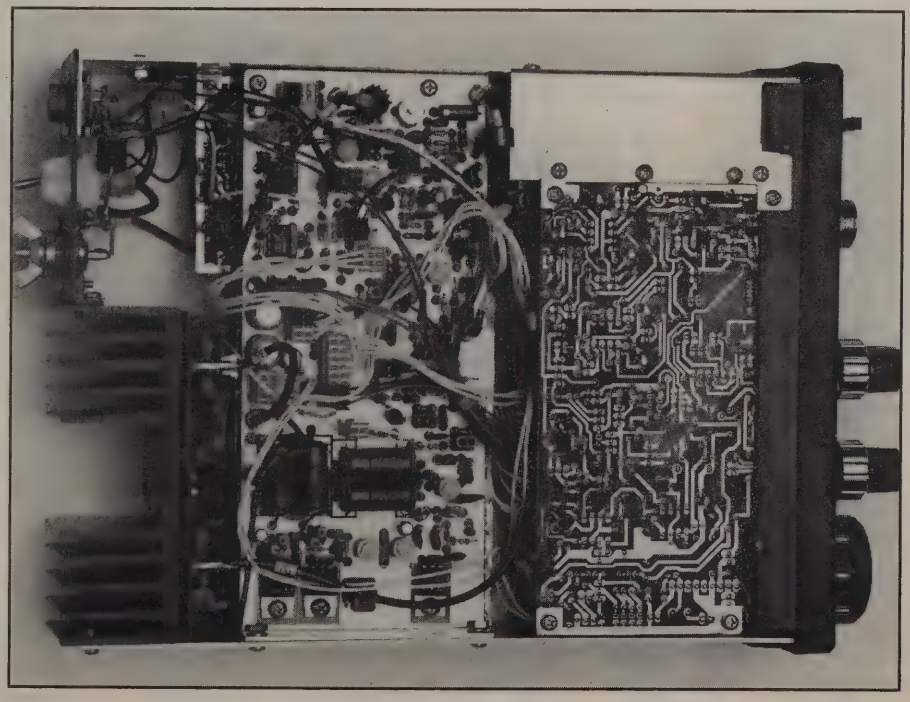
Tune the Scout to a relatively strong CW signal, and set the Jones filter at its widest position. Next start to tune at the zero beat of the signal and extend out to where the signal completely disappears (is no longer heard). Typically, at the widest filter setting I found that a strong signal could be first heard at, say, 14030.5 and would disappear at 14032.5, or a "heard" bandwidth of 2 kHz. At the sharpest Jones setting the same signal would go from 14030.5 and disappear at 14031.1, or a bandwidth of 600 cycles, and by any standard, that is excellent selectivity. I feel this is a "real world" test.

Talking of "real world," I spent many hours on the air asking for reports of my audio, and without exception the reports were of "crisp," "clear," and even "penetrating" audio.

I had also wondered if the fact that SSB was switched automatically for any given band would make a difference, but it was of no importance. This makes me believe that switchable upper and lower sidebands are a thing of the past and hold no real importance anymore.

A bit of history for the newcomer to amateur radio seems to be in order here. When SSB started out, because of the oscillator frequencies, etc., it was normal to have lower sideband emissions on some bands and upper sideband on others. Some amateurs wanted to be able to switch sidebands, and of course this meant more circuitry and more expense. In all my years, and they are many, on sideband there were only one or two times when I needed switchable sidebands, so don't let the lack of switchable sidebands keep you away from the Scout.

Ignition noise is a possible big problem when considering mobile operation. I have a Suburban that is quite noisy on 10 meters. I considered this as good a test as needed. The Scout has a built-in noise limiter that can be switched in or out. I tested it on several signals, and the noise from the car took out signals in the S0 to S7 range. It took a relatively strong signal to overcome the noise. Switching in the noise blanker made S2 and S3 signals perfectly readable, and depending on the engine speed, even made signals that did not move the S meter readable.



*Bottom of the transceiver with the cover removed.*

## CW and The Curtis Keyer

The keyer speed can be set from a few words a minute up to 50 wpm with full break-in. To set the keyer, you switch the speed switch on and send a string of dots. The panel LED readout shows the speed, so you can stop at your desired setting. A sidetone is provided.

ASTRON CORPORATION
9 Autry
Irvine, CA 92718
(714) 458-7277 • FAX (714) 458-0826

# ASTRON POWER SUPPLIES

**• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •**

MODEL VS-50M

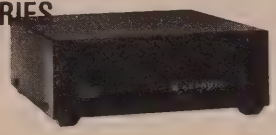
### SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-3A, RS-4A, RS-5A, RS-4L, RS-5L
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD except for RS-3A
- ONE YEAR WARRANTY • MADE IN U.S.A.

### PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- All units available in 220 VAC input voltage (except for SL-11A)

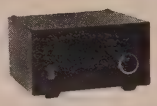
## SL SERIES



- LOW PROFILE POWER SUPPLY

| MODEL | Colors Gray | Colors Black | Continuous Duty (Amps) | ICS* (Amps) | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|---|---|
| SL-11A | • | • | 7 | 11 | 2⅝ × 7⅝ × 9¾ | 12 |
| SL-11R | • | • | 7 | 11 | 2⅝ × 7 × 9¾ | 12 |
| SL-11S | • | • | 7 | 11 | 2⅝ × 7⅝ × 9¾ | 12 |
| SL-11R-RA | | • | 7 | 11 | 4¾ × 7 × 9¾ | 13 |

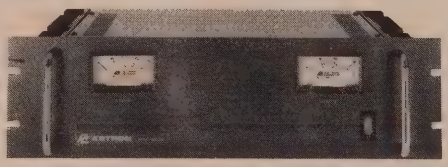
## RS-L SERIES



- POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

| MODEL | Continuous Duty (Amps) | ICS* (Amps) | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|
| RS-4L | 3 | 4 | 3½ × 6⅛ × 7¼ | 6 |
| RS-5L | 4 | 5 | 3½ × 6⅛ × 7¼ | 7 |

## RM SERIES

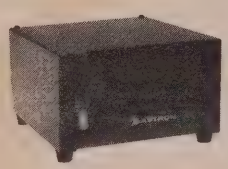


MODEL RM-35M

- 19" RACK MOUNT POWER SUPPLIES

| MODEL | Continuous Duty (Amps) | ICS* (Amps) | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|
| RM-12A | 9 | 12 | 5¼ × 19 × 8¼ | 16 |
| RM-35A | 25 | 35 | 5¼ × 19 × 12½ | 38 |
| RM-50A | 37 | 50 | 5¼ × 19 × 12½ | 50 |
| RM-60A | 50 | 55 | 7 × 19 × 12½ | 60 |
| • Separate Volt and Amp Meters | | | | |
| RM-12M | 9 | 12 | 5¼ × 19 × 8¼ | 16 |
| RM-35M | 25 | 35 | 5¼ × 19 × 12½ | 38 |
| RM-50M | 37 | 50 | 5¼ × 19 × 12½ | 50 |
| RM-60M | 50 | 55 | 7 × 19 × 12½ | 60 |

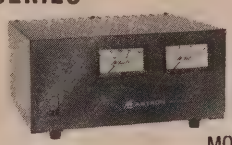
## RS-A SERIES



MODEL RS-7A

| MODEL | Colors Gray | Colors Black | Continuous Duty (Amps) | ICS* (Amps) | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|---|---|
| RS-3A | | • | 2.5 | 3 | 3 × 4¾ × 5¾ | 4 |
| RS-4A | • | • | 3 | 4 | 3¾ × 6½ × 9 | 5 |
| RS-5A | | • | 4 | 5 | 3½ × 6⅛ × 7¼ | 7 |
| RS-7A | • | • | 5 | 7 | 3¾ × 6½ × 9 | 9 |
| RS-7B | • | • | 5 | 7 | 4 × 7½ × 10¾ | 10 |
| RS-10A | • | • | 7.5 | 10 | 4 × 7½ × 10¾ | 11 |
| RS-12A | • | • | 9 | 12 | 4½ × 8 × 9 | 13 |
| RS-12B | | • | 9 | 12 | 4 × 7½ × 10¾ | 13 |
| RS-20A | • | • | 16 | 20 | 5 × 9 × 10½ | 18 |
| RS-35A | • | • | 25 | 35 | 5 × 11 × 11 | 27 |
| RS-50A | • | | 37 | 50 | 6 × 13¾ × 11 | 46 |
| RS-70A | • | | 57 | 70 | 6 × 13¾ × 12⅛ | 48 |

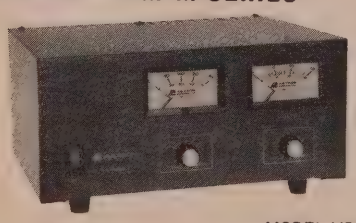
## RS-M SERIES



MODEL RS-35M

| MODEL | Continuous Duty (Amps) | ICS* (Amps) | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|
| • Switchable volt and Amp meter | | | | |
| RS-12M | 9 | 12 | 4½ × 8 × 9 | 13 |
| • Separate volt and Amp meters | | | | |
| RS-20M | 16 | 20 | 5 × 9 × 10½ | 18 |
| RS-35M | 25 | 35 | 5 × 11 × 11 | 27 |
| RS-50M | 37 | 50 | 6 × 13¾ × 11 | 46 |
| RS-70M | 57 | 70 | 6 × 13¾ × 12⅛ | 48 |

## VS-M AND VRM-M SERIES

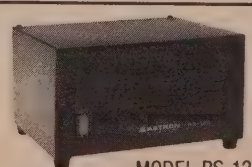


MODEL VS-35M

- Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

| MODEL | Continuous Duty (Amps) @13.8VDC | @10VDC | @5VDC | ICS* (Amps) @13.8V | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|---|---|
| VS-12M | 9 | 5 | 2 | 12 | 4½ × 8 × 9 | 13 |
| VS-20M | 16 | 9 | 4 | 20 | 5 × 9 × 10½ | 20 |
| VS-35M | 25 | 15 | 7 | 35 | 5 × 11 × 11 | 29 |
| VS-50M | 37 | 22 | 10 | 50 | 6 × 13¾ × 11 | 46 |
| • Variable rack mount power supplies | | | | | | |
| VRM-35M | 25 | 15 | 7 | 35 | 5¼ × 19 × 12½ | 38 |
| VRM-50M | 37 | 22 | 10 | 50 | 5¼ × 19 × 12½ | 50 |

## RS-S SERIES



MODEL RS-12S

- Built in speaker

| MODEL | Colors Gray | Colors Black | Continuous Duty (Amps) | ICS* Amps | Size (IN) H × W × D | Shipping Wt. (lbs.) |
|---|---|---|---|---|---|---|
| RS-7S | • | • | 5 | 7 | 4 × 7½ × 10¾ | 10 |
| RS-10S | • | • | 7.5 | 10 | 4 × 7½ × 10¾ | 12 |
| RS-12S | • | • | 9 | 12 | 4½ × 8 × 9 | 13 |
| RS-20S | • | • | 16 | 20 | 5 × 9 × 10½ | 18 |
| SL-11S | • | • | 7 | 11 | 2¾ x 7⅝ x 9¾ | 12 |

*ICS—Intermittent Communication Service (50% Duty Cycle 5min. on 5 min. off)

## FOR MFJ-422B-X (KEYER WITHOUT PADDLE)

If you purchased the MFJ-422B-X (Keyer without Paddle) for connection to your own "BENCHER" paddle, follow the procedure below for proper connection.

1. Remove the rubber foot from the bottom rear of your "BENCHER" paddle.
2. Remove the plastic cable clamp from the bottom center of the paddle.
3. Solder the shield on the cable from the MFJ-422B-X to the solder lug located between the rear rubber foot and the cable clamp on the bottom of the paddle.
4. Solder the red wire in the cable from the MFJ-422B-X to the solder lug on the dot post of the paddle and the white wire to the solder lug on the dash post.
5. If battery operation is desired, install a 9V transistor battery in the battery snap in the MFJ-422B-X and slip the battery into the battery holder. (NOTE: Long-life Alkaline type batteries are recommended for longest uninterrupted operation.)
6. Replace the screw holding the rear rubber foot on the paddle withthe 4-40 X 3/8" screw supplied with the MFJ-422B-X
7. The MFJ-422B-X can now be slid onto the "BENCHER" paddle from the rear. Feed the cable through the slot in the bottom right rear of the box. Secure the box to the paddle by remounting the rear rubber foot through the box to the paddle base. Fold the cable up neatly and secure with the plastic cable clamp on the bottom of your "BENCHER" paddle.

## TRANSMITTER CONNECTION

### (MFJ-422B/422B-X)

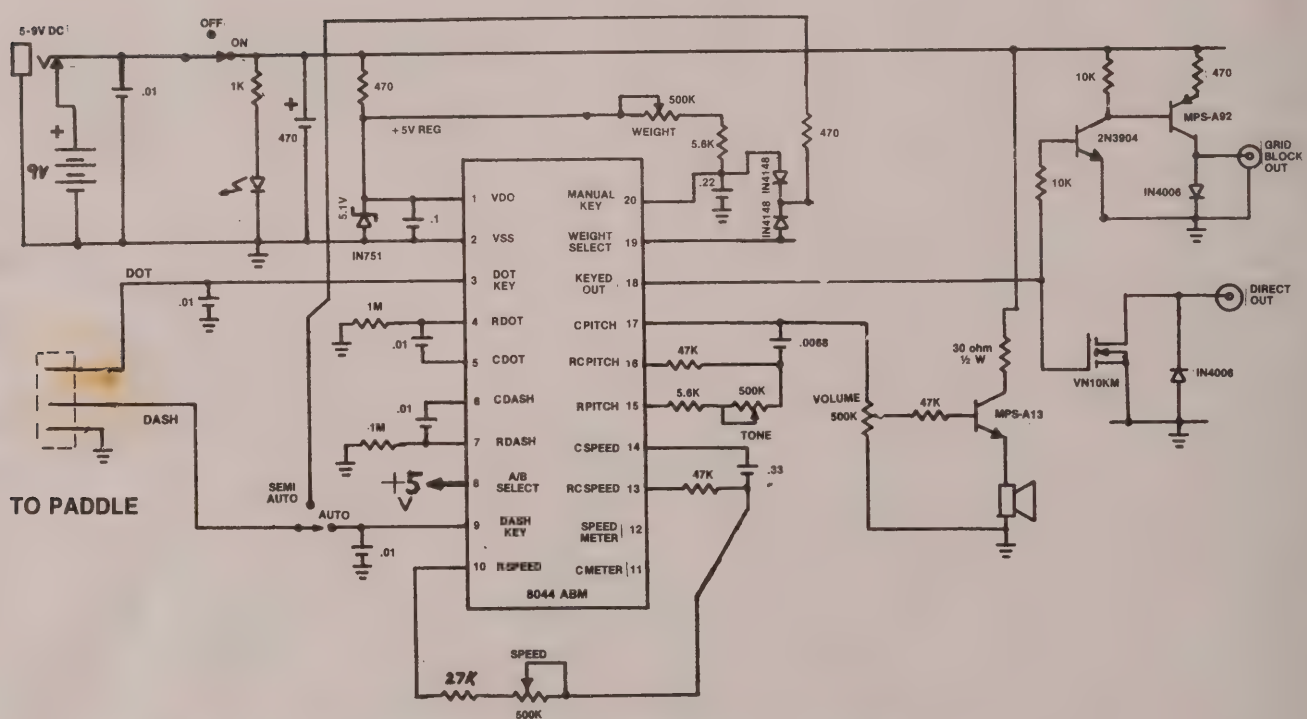
1. Provision is made for powering the MFJ-422B/422B-X with external 5-9V DC supply. A subminiature POWER jack is located on the rear of the MFJ-422B/422B-X for this purpose. An optional AC adapter is available from MFJ Enterprises, Inc. When a plug is inserted into the POWER jack, the battery is automatically disconnected. Use an adapter with a 2.5mm phone plug with the tip being positive.
2. Connect a shielded cable from the KEYING OUTPUT of the 422B/422B-X to your transmitter. Consult the instructions for your transmitter to determine whether to use the "Direct" or "Grid Block" output jack. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continuously when the cable is plugged into one jack, use the other one.)

## OPERATION

After proper connection of the MFJ-422B/422B-X you are ready for operation. Rotate the VOLUME control clockwise to turn power on as indicated by the LED light. Start sending with the paddle and adjust the VOLUME, SPEED, TONE, and WEIGHT controls to your preference. (NOTE: If a steady tone at high speed occurs, reduce

the WEIGHT or the SPEED by turning the respective control counter-clockwise.)

The dot and dash memory feature of the Curtis 8044 ABM IC makes sending easier. This feature allows keying a dot before completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash paddle and then the dot paddle before of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determine whether a dot or dash occurs first.




**MFJ-422B/422B-X SCHEMATIC DIAGRAM**

# MFJ ECONO KEYER II
## MODEL MFJ-401B

## OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


# MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-401B INSTRUCTIONS

Thank you for purchasing the MFJ-401B ECONO KEYER II. This new MFJ-401B uses the Curtis 8044 ABM IC, the most advanced IC developed strictly for HAM use.

Please read the following instruction before operating the keyer.

## INSTALLATION

1. A) Battery operation: Remove the four screws on the sides and remove the cover to install a 9V transistor battery. A battery holder on top of the cover and a battery clip are provided for installing the 9V battery.
   B) External Power operation: A 5-9V DC, 300mA power supply can be used to power the MFJ-401B. A 2.5mm plug should be used with the tip of the plug being positive. An optional 5V AC adapter is available from MFJ Enterprises, Inc.

2. A squeeze key or a single level key can be used to key the MFJ-401B if auto keying is desired. A squeeze key will allow IAMBIC operation. Use a standard quarter inch stereo phone plug and with either two conductor common shielded cable or two single conductor shielded cables with the shields tied together and connected to ground. The dot wire should be wired to the ring of the plug. The shield wire should be connected to ground. For straight key operation, a standard quarter inch stereo plug should be used.(Mono plug will not work on a straight key on the MFJ-401B.) Connect one wire to the tip of the plug and another wire to ground. The ring of the plug should not be connected. For straight key operation the AUTO/SEMI-AUTO switch should be pushed in.

3. The solid state output keying circuit allows keying of the grid block, cathodes and solidstate transmitter. For grid block keying, use the RCA jack marked "GRID BLOCK". For solid state or cathode keyed transmitters, use the output marked "DIRECT". The grid block output keys a maximum negative voltage of 200 volts to ground at 10 mA. The direct output keys a maximum positive voltage of 300 volts to ground at a maximum current of 200mA. Connect a shielded cable from the KEYING OUTPUT of the MFJ-401B to the transmitter. Consult the instruction manual for your transmitter to determine which output to use. (NOTE: If in doubt as to which jack to use, try both jacks. If the transmitter keys continously when the cable is plugged into one jack, use the other one.)

## OPERATION

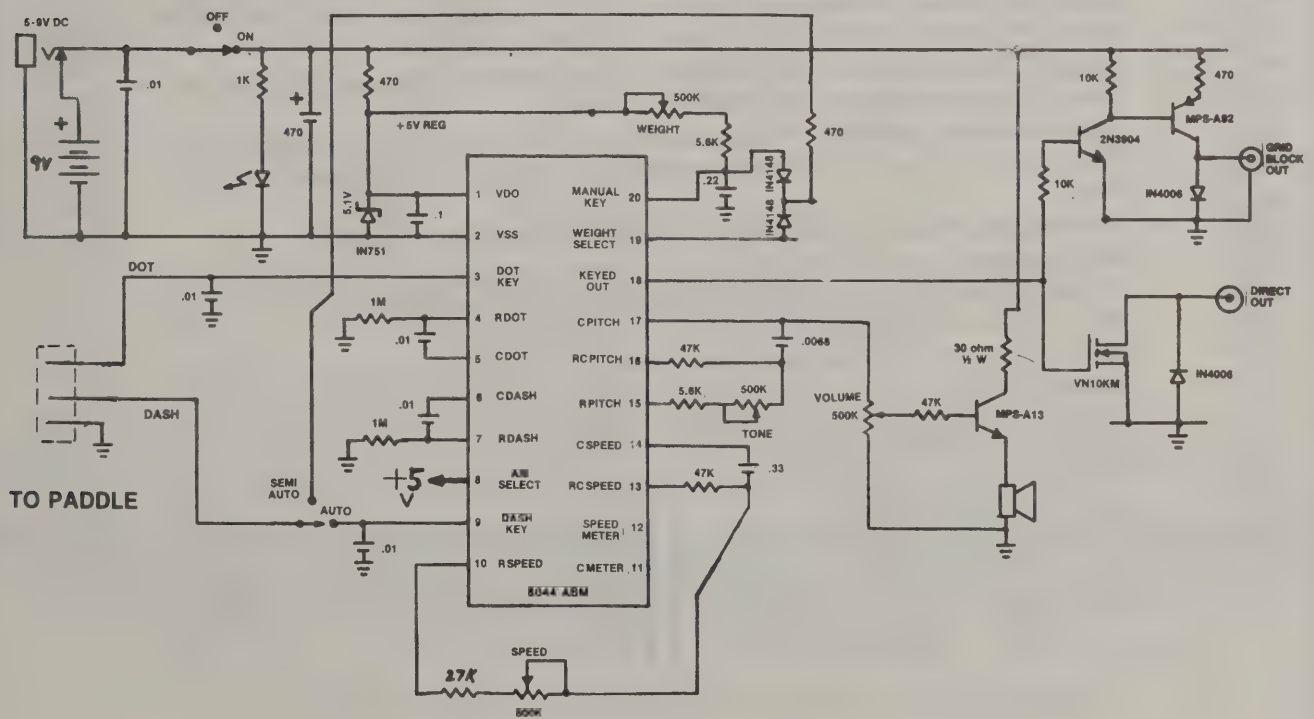
After proper connecting of the MFJ-401B to the transmitter, turn the MFJ-401B on by pressing in the red ON/OFF switch. Rotate the volume control for desired side-tone volume (if your transmitter has built-in side-tone, the side-tone on the MFJ-401B need not be

used. This will conserve the battery.) Adjust the speed control for the desired speed.

The tone control is located internally. It can be adjusted by using a small screwdriver on the left side of the keyer. The weight control is factory set at 1:3:1. This is also an internal control and can be adjusted with a screwdriver on the left side of the keyer. The tone control is the front hole of the keyer and the weight control is the rear hole.

The AUTO and SEMI-AUTO switch serves an automatic function when it is in the out position. When it is pushed in, the keyer is in the semi-automatic mode. This is the "BUG" operation. The keying will generate dots automatically and dashes are manually made. When the AUTO/SEMI-AUTO switch is pushed in and the dash paddle is held in, the keyer will continously key the transmitter for tuning.

Dot and Dash memory: The dot and dash memory feature on the MFJ-401B makes sending easier. This feature can be checked by setting the keyer to the lowest speed and tapping first, the dash paddle and then the dot paddle before the completion of the dash. The dash memory can be checked in a similiar manner. The dot insertion feature allows you to tap the dot paddle while holding in the dash paddle. A dot will be inserted automatically. The dash insertion feature allows you to insert a dash while holding in the dot paddle. With both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. First paddle contact determines whether a dot or dash occurs first.

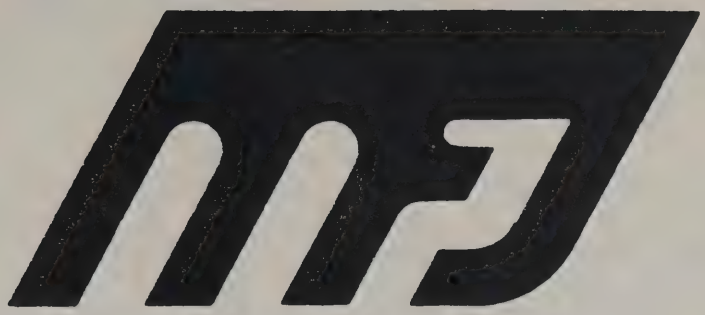



**MFJ-401B SCHEMATIC DIAGRAM**

## FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for **$4.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a **$4.00** personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is delivered prepaid. All charges will be shipped COD to the owner.
9. This warranty is given in lieu of any other warranty express or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvement in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 921A Louisville Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.



# MFJ DELUXE ELECTRONIC KEYER

MODEL MFJ-407B

## OWNER'S MANUAL

**CAUTION: Read All Instructions Before Operating Equipment.**


# MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA


© MFJ ENTERPRISES, INC.

# MFJ-407B DELUXE ELECTRONICS KEYER

The MFJ-407B DELUXE ELECTRONICS KEYER uses the reliable Curtis 8044 ABM Keyer IC to make it easy to send perfect code.

## CONTROL FUNCTIONS

1. PWR SWITCH: This switch turns the unit ON and OFF.
2. SPEED CONTROL: Variable from 8 to 50 WPM.
3. WEIGHT CONTROL: When turned fully counter clockwise, dot-dash-space ratio is a perfect 1:3:1. Turn clockwise to increase or decrease dot and dash lengths depending on the WEIGHT Push Button setting.
4. WEIGHT INC/DEC: This switch determines whether the WEIGHT CONTROL will INCrease or DECrease the dot and dash lengths from the full counter clockwise position of the WEIGHT CONTROL.
5. SEMI-AUTO: Allows semi-automatic "bug" and manual operations. When a squeeze or single lever key is used the keyer generates dots automatically. Dashes are manually made. When a straight key is used, the keyer is completely manual.
6. TONE CONTROL: Set for the desired side tone pitch.
7. TUNE SWITCH: Keys your transmitter continuously for tuning.
8. VOLUME CONTROL: Adjust the loudness of the sidetone from the internal speaker.
9. IAMBIC A/B SELECT: Located on the back of the unit, this switch allows the choice of IAMBIC Type "A" or Type "B". Type "A" does NOT produce a following alternate element when a squeeze is released during a dot or dash. Type "B" does produce a following alternate element after squeeze release. For example, in Type "A", squeeze release during the "dah" in the letter A will produce just the A. In Type "B", squeeze release during the "dah" in the letter A will produce an R.

## INSTALLATION

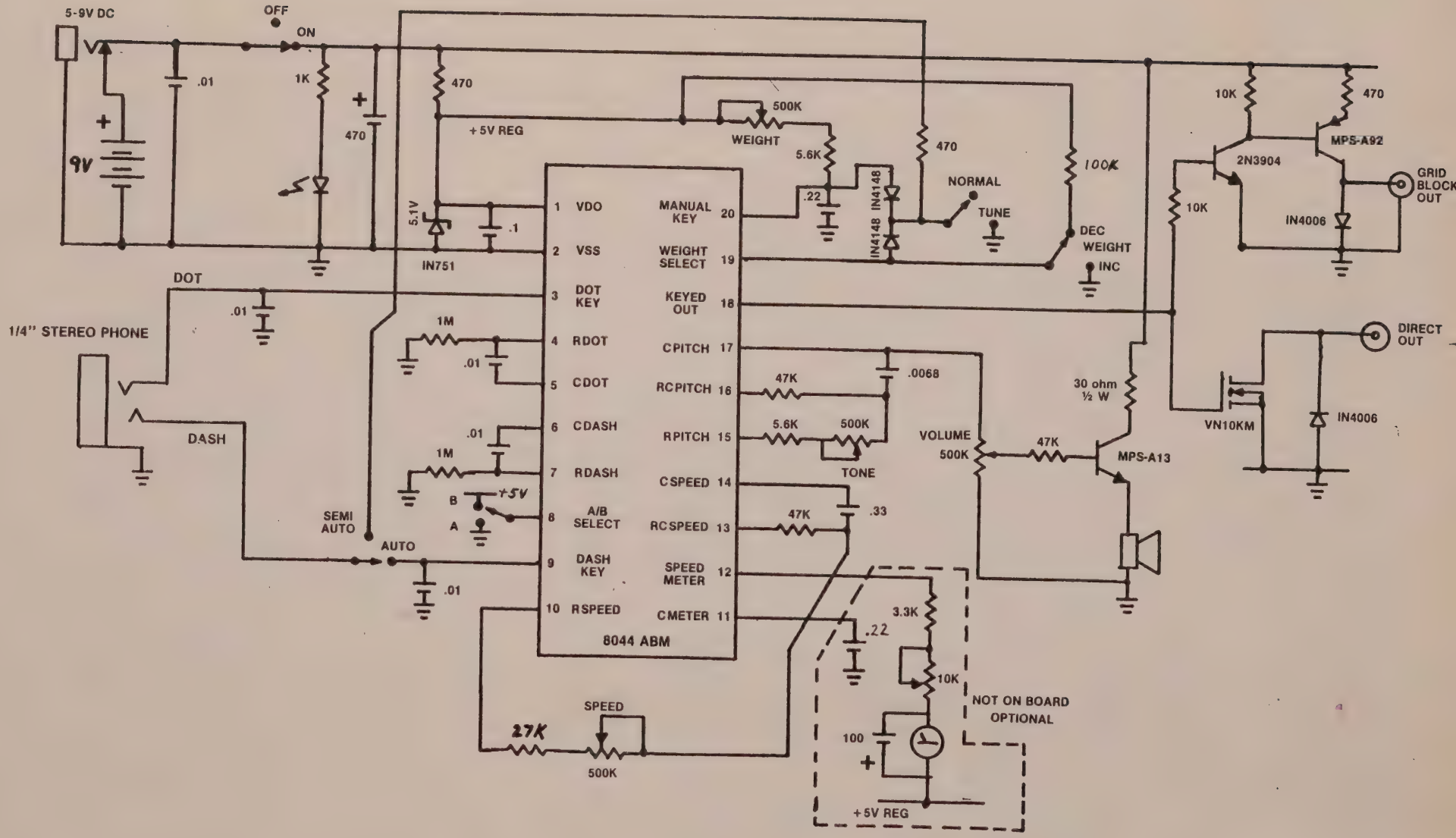
1. To install a 9V transistor battery, remove the two screws on the side of the box.
2. An optional AC ADAPTOR (5-9V DC) may also be used. First plug the ADAPTOR into the subminiature jack on the rear panel and then plug the ADAPTOR into a 110V outlet. When the external power is used the batteries are automatically disconnected. Use an adaptor with a 2.5 mm plug. The tip of the plug should be positive.
3. A squeeze or single lever key can be used. Squeeze key allows IAMBIC operation. Use a standard quarter inch stereo phono plug and a two conductor shielded cable. If seperately shielded cables are used, tie the two shields together and connect them to ground. Connect the dot wire to the ring of the plug and the dash wire to the tip. When a straight key is used the MFJ-407B becomes a manual keyer. It will safely key your transmitter and eliminate the shock hazard of high voltage being present on the straight key. NOTE: To use a straight key, first switch the keyer to the SEMI-AUTO mode.

Again a standard quarter inch stereo phono plug should be used. (Mono plug will not work on a straight key on SEMI-AUTO mode.) Connect one wire to the tip of the plug and another wire to ground. The ring of the plug should not used.

## KEYER OPERATION

1. Install 9V battery or use an optional AC ADAPTOR to supply power to the keyer.
2. Plug in key paddle to KEY jack. A dual paddle squeeze key or a single lever key can be used.
3. Turn the Keyer ON and set the SEMI-AUTO switch to AUTO.
4. Start sending with paddle and adjust volume, tone, weight, and speed to your preference. NOTE:If a steady tone at high speed occurs, reduce the weight or the speed by turning the respective knob counterclockwise.
5. The dot and dash memories ease sending. It allows keying a dot before the completion of a dash or vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash lever and then the dot lever before the completion of the dash. The keyer will provide both the dash and the dot. The dash memory can be checked in a similar manner. The dot insertion feature allows you to tap the dot lever while holding the dash lever in to insert a dot. The dash insertion feature allows you to insert a dash while holding the dot lever in. When using squeeze key and with both paddles squeezed, the IAMBIC operation feature allows sending of alternate dots and dashes. The first contact determines whether a dot or dash occurs first.
6. Select either IAMBIC A or B according to your preference.

# MFJ-407B SCHEMATIC DIAGRAM



# SSK - 1 SQUEEZE KEY

Your new Nye Viking Squeeze Key is designed to give many years of trouble free use and requires practically no care. The "knife edge" bearings allow free movement of the keying paddles without further adjustment. The tension adjusting spring maintains the paddles against the bearing edge and the back stop. If the tension spring is adjusted for "feather touch" there is some tendency for the paddle to "float" up or down on the bearings - this in no way effects the operation of the key.

Wire the dot generator to the left hand contact assembly and the dash generator to the right hand set. Left handed people connect the keyer so that the right hand paddle produces dots and the left hand paddle dashes.

To adjust spring tension remove the dust cover and loosen the 6-32 lock nut on the side of the dash paddle with a $\frac{1}{4}$" nut driver and adjust the screw to suit -- tighten lock nut when complete.

To adjust the contact spacing or paddle travel loosen the two contact bracket mounting screws and adjust contact spacing to suit.

Caution: Never attempt to clean the contacts with anything other than a very soft tissue - the gold plating is 24 carat and very soft. It would be destroyed by any abrasive.

For best results, your squeeze key should be securely mounted to your operating table. To mount the key use #8 sheet metal type screws or #8 pan head machine screws. It will be necessary to remove one of the screws holding the contact assembly and turn the contact assembly aside -- secure the key base and readjust the contact assemblies.

Some tips on using your new Nye Viking Squeeze Key:

Although your Nye Viking Squeeze Key can be used with any electronic keyer one that provides true iambic keying will give you the most enjoyment. Iambic keying simplifies the sending of Morse Code considerably over old fashioned "bugs" and single paddle electronic keys. Many letters are formed with a single squeeze such as "C"'s and "K"'s. These should be practiced until perfect.

Start off by adjusting the speed control to the letter speed you intend to use even though it may take a little practice before your word speed catches up.

Practice sending "C" by pressing the dash paddle first then the dot paddle holding both paddles closed until the "C" is completed then release the dash paddle first and then releasing the dot paddle.

Practice "F" by closing the dot paddle and then the dash paddle on the second dot momentarily, then release the dot paddle during the last dot.

Practice "K" the same as "C" except release the dot paddle first.

"L" is transmitted the same as "F" except the dash is inserted after the first dot.

"Q" and "Y" are easy squeeze key characters and are sent by closing the dash key and touching the dot key momentarily at the right moment.

"R" is sent by closing the dot paddle first then touching the dash paddle and then releasing the dot paddle.

Keep the dust cover in place to reduce contact fouling.

Wm. M. Nye Company, Inc. BELLEVUE WASH 98005 • (206) 454-4524

# *Super CW Keyboard*

*Model MFJ-452/452X*

**INSTRUCTION MANUAL**

CAUTION: Read All Instructions Before Operating Equipment


**MFJ ENTERPRISES, INC.**

300 Industrial Park Road
Starkville, MS 39759 USA
Tel: 601-323-5869 Fax: 601-323-6551


VERSION 2C

COPYRIGHT © 1996 MFJ ENTERPRISES, INC.

# *MFJ-452 Super CW Keyboard*

## Features

- Includes eight independent 250-character message memories.
- 150-character type-ahead buffer available with audible "buffer full" warning.
- Paddle jack makes MFJ-452 a keyboard-controlled iambic keyer. Iambic paddle, space bar, or single-lever usable as straight keys.
- Embedded commands include auto-incrementing serial numbers, timed pauses up to 99 minutes 99 seconds, and message loops.
- Adjustable parameters vary code speed from 5 to 100 WPM and code weight from 5 to 95 %.
- Internal sidetone speaker with adjustable volume and frequency.
- Output tune mode has constant key to adjust tuners or antennas.
- LCD readout displays buffer contents and transmitted text.
- Practice operation using key-output disable and Farnsworth mode for random code generator.

## Installation

The MFJ-452 is supplied with an IBM-AT compatible keyboard. The MFJ-452X package does not include a keyboard. The unit is guaranteed to support the supplied keyboard but may be used with other standard 101 key AT-style keyboards. However, the use of an AT-compatible keyboard from other manufacturers may cause an increase in susceptibility to radio frequency interference. If using a switchable keyboard, move the A-X switch on the back of the keyboard to the "A" position. ***Using an XT style keyboard or turning a switchable keyboard to "X" mode may damage both the keyboard and the MFJ-452. This unit will function only with AT compatible keyboards.*** Plug the keyboard into the 5 pin DIN connector marked **KYBRD IN** on the MFJ-452.

The MFJ-452 Morse Keyboard requires a 12 Vdc 250 milliamp power supply. The power jack accepts a 2.1mm coaxial plug with the center conductor positive and shield ground. An optional dc supply, the MFJ-1312B, is available from MFJ Enterprises. Connect your MFJ-1312B Power Adapter or compatible dc supply into the jack marked **POWER** on the MFJ-452 back panel.

This unit supports both positive and negative keyed radios. Connect a standard shielded RCA cable between your radio key input and the MFJ-452's key output. The MFJ-452 is set up for a **direct** or positive keyed radio (most solid state radios). The unit can be adjusted for **grid block** or negative radios (most radios with tube finals) by shorting the left most pair of pins on JMP1. JMP1 is located, with the POWER switch toward you, to the right rear of the PC board.

Connect the paddle to the 3.5mm stereo phone jack with a shielded cable through the back of the unit. Connect the dot wire of the paddle to the ring on the plug and the dash wire to the tip. The shield on the plug should be attached to paddle ground. An external speaker can be connected to the speaker output on the rear of the unit using the 3.5mm mono plug.

## Keyboard Operation

When the MFJ-452 is activated, it will send the characters "ON" in Morse code over the sidetone speaker and turn on the **POWER** LED. This confirms that the unit is ready for operation. Character message memories can now be set along with the speed, tone, and weight of the code. Volume level can also be adjusted using the volume control on the front of the unit.

Pressing a key will send a character to the key output and the speaker. Characters typed faster than can be transmitted at the current code speed will fill the type-ahead buffer. This buffer empties as the code is played. Characters may be removed from the buffer by pressing the backspace key. When the buffer reaches 130 characters the sidetone frequency will lower. If the buffer fills to capacity, an error tone will sound every time a key is pressed, and any characters typed over 150 will be lost.

Transmitted characters and buffer text may be monitored using the LCD display on the MFJ-452. This readout is comprised of two lines of text, each containing 16 characters. The top line shows the text in the buffer. The bottom line shows the text currently being transmitted.

During transmission, the type ahead buffer may be cleared by pressing **Esc**. When the buffer is empty, a new message may be played, or new text entered. Selecting **Pause** during transmission stops playback of the buffer text and allows entry of text with the paddle. **Esc** resumes the playback of the buffer text from the point where it was interrupted.

## Adjusting Code Parameters

**Note:** The output key is disabled during parameter changes so that no erroneous code is transmitted.

### Code WPM Speed

Code speed is set using the **F10** key. After **F10** is pressed, the MFJ-452 sends a series of dot-dashes over the sidetone speaker to indicate the current speed. The up and down arrow keys can be used to vary the speed gradually. Code speed can also be set to an approximate words-per-minute by entering a two-digit number (i.e., 05 or 13). The speed will then change to the new setting automatically. When all speed changes are complete, press **Esc** or **Enter** to exit the speed change mode.

### Code Weight

To adjust the code weight, select **F9** to enable the command mode and press **W**. A series of dot-dashes is played from the sidetone speaker. The up and down arrows may be used to adjust the on-time and off-time length of a dot or dash. Press either **Esc** or **Enter** to exit. This feature allows personalized code and can help to avoid clipping if the radio or amplifier has a send delay. It can also increase the radio's power out by increasing on time.

### Sidetone Frequency

To adjust sidetone frequency, press **F9** to enable the command mode, and press **T**. This command will toggle the sidetone on, and the unit will sound the present tone setting. Use the up and down arrow keys to increase or decrease the sidetone setting. Note that the tone will not affect the transmitted signal. Only the sidetone speaker frequency changes. Press either **Esc** or **Enter** to exit the tone change mode.

**Note:** All code parameters, speed, weight, sidetone, random code setup, and message memories are saved in nonvolatile memory. Memory life is rated greater than 20 years.

## Message Memories

The MFJ-452 has eight 250-character message memories. These memory locations are represented by the function keys **F1-F8**. To record a message to memory, press and hold the **Alt** key while selecting a memory position. When the MFJ-452 signals the characters "--. ---" or "GO" in Morse, it is ready to record the message, which is displayed on the bottom line of the LCD readout as it is typed. If the typed message exceeds 240 characters in length, playback frequency lowers to indicate that memory is short. Characters may be removed from memory by using the **Backspace** and new characters may be entered. No more than 250 characters may be stored in any message location. Any attempt to enter additional characters will generate a long, low-frequency tone for each character entered.

To complete the saving of a message, press **Enter**. An end of message character (.-.-.) will sound to confirm the save. A programmed message can be replayed by pressing the appropriate function key **F1-F8.** The keyer will display a lower case character to indicate message play when the function key is pressed. The character "a" is displayed in the buffer when sending message 1 (**F1**).

**example:** Select **Alt-F2**. The keyer signals "--. ---" to indicate readiness. Type the message "AA5MT BEACON BEACON 5 W BEACON." Press **Enter** and the message is stored at memory location **F2**. Select **F2** to play message.

### Removal of Message

To remove the message, choose the designated function key (**F1-F8**) you want to remove (**F2** in this case). Press the **Alt** & that function key then **Enter** without typing or keying anything into memory. The message is now removed.

## Embedded Commands

**Note:** To use the "**Ctrl-#**" command, where "#" represents a keyboard character, press and hold **Ctrl**, press and release the "#" key, then release the **Ctrl** key.

While a message is being saved, one or more **embedded commands** may be added as special features.

**Ctrl-L** creates a repeating message. Use the **Ctrl-L** at the end of the message before pressing **Enter**. The MFJ-452 will play the message to the point where **Ctrl-L** is entered and then repeat.

**example:** AA5MT BEACON 5 W **Ctrl-L Enter**. This message repeats until **Esc** is pressed.

**Ctrl-P** creates a timed pause within a message. Use **Ctrl-P** followed by four numbers in a "xxxx" format to set the pause duration from 00 minutes, 01 seconds to 99 minutes, 99 seconds.

**example:** CQ CQ CQ DE KB5JOB **Ctrl-P** 0045 **Ctrl-L Enter**. This message repeats every 45 seconds until **Esc** is pressed.

**Ctrl-S** controls the serial numbering feature. Use **Ctrl-S** at the end of the message before pressing **Enter**. The MFJ-452 will play the message to the point where **Ctrl-S** is entered, at which point the serial number is played and auto-incremented up to 9999. The serial number function sends an "N" character for nine and a "T" for zero. A new serial number may be stored by selecting **F9** to enable the command mode and then pressing **S** followed by four numbers in a "xxxx" format. Pressing **F12** will decrement the serial number and the keyer will echo "D" for every decrement.

**example:** YOU ARE CONTACT NR **Ctrl-S** FOR THE BRYANT MEMORIAL WD4DAT **Enter**.

## Command Mode

During normal operation, the **F9** key is used to enter the command mode. When the command mode has been enabled, the keyer responds by signaling "CO." The unit is now ready to receive one of the available one-character commands listed below through the keyboard or paddle. The keyer responds to an invalid entry by returning to normal mode.

**H** This command allows use of the space bar or paddle as a hand (straight) key. The keyer responds to this command by sending :"HK." Dots and dashes are then made manually by using either the space bar on the keyboard or one of the paddle keys. Press **Esc** to exit.

**T** This command is used to set the frequency of the sidetone speaker with the keyboard by using the up and down arrows to vary sidetone. Press **Esc** to exit.

**W** This command enables the code weight settings mode. An alternating dot and dash signal is produced and the signal is modified with the keyboard by using the up and down arrows to vary code weight. Press **Esc** to exit.

**O** This command enables the operator to turn off the output of the keyer.

**S** This command is used to store a new serial number. The serial number must four digits in length, and can range from 0000 to 9999. After entering the 4 characters, Press Enter to embed the number.

**Q** This command queries the unit for code parameters. The display is in the following format:

### Factory Settings

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | = | 2 | 0 | | W | = | 5 | 0 | | T | = | 0 | 7 | 1 | 4 | | | |
| N | = | 0 | 0 | 0 | 1 | | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | | |
| | | | | | | | | | F | L | C | A | P | G | N | | | |

S = speed in WPM

W = weight in % on time

T = sidetone frequency in Hz

N = serial number

1x = Farnsworth mode on/off

2x = 5 character length on/off

3x = 6 character length on/off

4x = alphabetic character on/off

5x = punctuation on/off

6x = prosign on/off

7x = Numeric character

In order to operate the different sections of the random code, you must first check the settings of the parameters of the keyer. There are various settings for the parameters to isolate a particular group of characters. After setting the parameters to activate the transmission of the characters, you must enter the random code mode "F9" "R" then "Enter".

**F** This command toggles Farnsworth mode on and off. This mode sets the speed of the random code generator. Character speed is set to 18 WPM while keeping the overall word speed at the keyer's current setting. If the keyer is set to 5 WPM in Farnsworth mode, it will send characters at 18 WPM while inserting extra word-break and inter character timing to maintain an effective speed of 5 WPM. This feature allows novices to learn Morse characters by sound rather than by counting dots and dashes. While in this mode, the keyers output is disengaged.

**L** Toggles between 5-character word length or random word length from 1-8 characters. The keyer signals "OK" after the command is entered. The keyer's default setting sends 5-character words in alphabetic characters. To study certain characters, select **C** to choose a fixed character set. The default set is **01 (A-F)**.

**C** Toggles between enabling sets **N, P, G,** and **A** and enabling fixed character sets **01-09**. ( See # command )

**#** A one-digit entry between 1 and 9 is entered to choose a six-character set. The available sets, and the entries needed to choose them, are as follows:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| A | G | M | S | Y | 4 | . | _ | ; |
| B | H | N | T | Z | 5 | ? | + | ( |
| C | I | O | U | 0 | 6 | " | , | ) |
| D | J | P | V | 1 | 7 | $ | - | / |
| E | K | Q | W | 2 | 8 | ' | = | **Start** |
| F | L | R | X | 3 | 9 | ¶ | : | **Invitation to transmit** |

*See Morse Code Table on page 7 for a more complete listing of the code.*

**A** Toggles random alphabetic characters on and off

**P** Toggles random punctuation characters on and off

**G** Toggles random prosign characters on and off

**N** Toggles random numeric characters on and off

**R** This command is used to start the random code generator after the code generator-defaults have been set ( see **F, L, N, P, G, A, and C** ). Press **Esc** to exit the code generator.

When choosing the parameter in which you wish to operate, you must decide what and how you want the codes sent. Some examples of setting up the parameters are as follows:

**example:**

1000101 setting for parameter (Farnsworth mode, puntuation and numeric character)

**example:**

1101000 (Farnsworth, Random word length 1-8 characters, alphabetic charater)

**example:**

1100001 (Farnsworth, Random word length 1-8 characters, numeric character)

**example:**

0001000 (Alphabetic character)

**example:**

0101000 (Random word length, alphabetic character)

The examples given are some of the ways you can set your parameters. By deciding if you want numbers, letters, punctuations, prosigns, or all, you can set your parameter to do so. You must remember to enter random code mode to activate the setting of your parameter (press **F9, "R",** then press **Enter**).

## Keyboard Commands

### Message Memories

The function keys **F1** through **F8** are used to store and send messages. The **Alt** key is used with a function key to store a message. The function key is then used alone to send the stored message. See the **MESSAGE MEMORIES** section for more details.

### Command Mode

The command mode is accessed by selecting the **F9**. This selection is followed by a one-character keyboard command.

### Code WPM Speed

The speed of the code is accessed through the **F10** key. The speed can then be varied using the up and down arrow keys or direct two-character entry. Press ESC to exit.

### Output Tune

An output tune is activated by selecting **F11**. A constant tune is sent to the antenna and tuner. Press **Esc** to exit.

### Serial Number Decrements

The **F12** command decrements the serial number. This command should be selected as a message is being sent. The keyer will echo "-.." or "D" for every decrement in the serial number.

## Paddle Operation

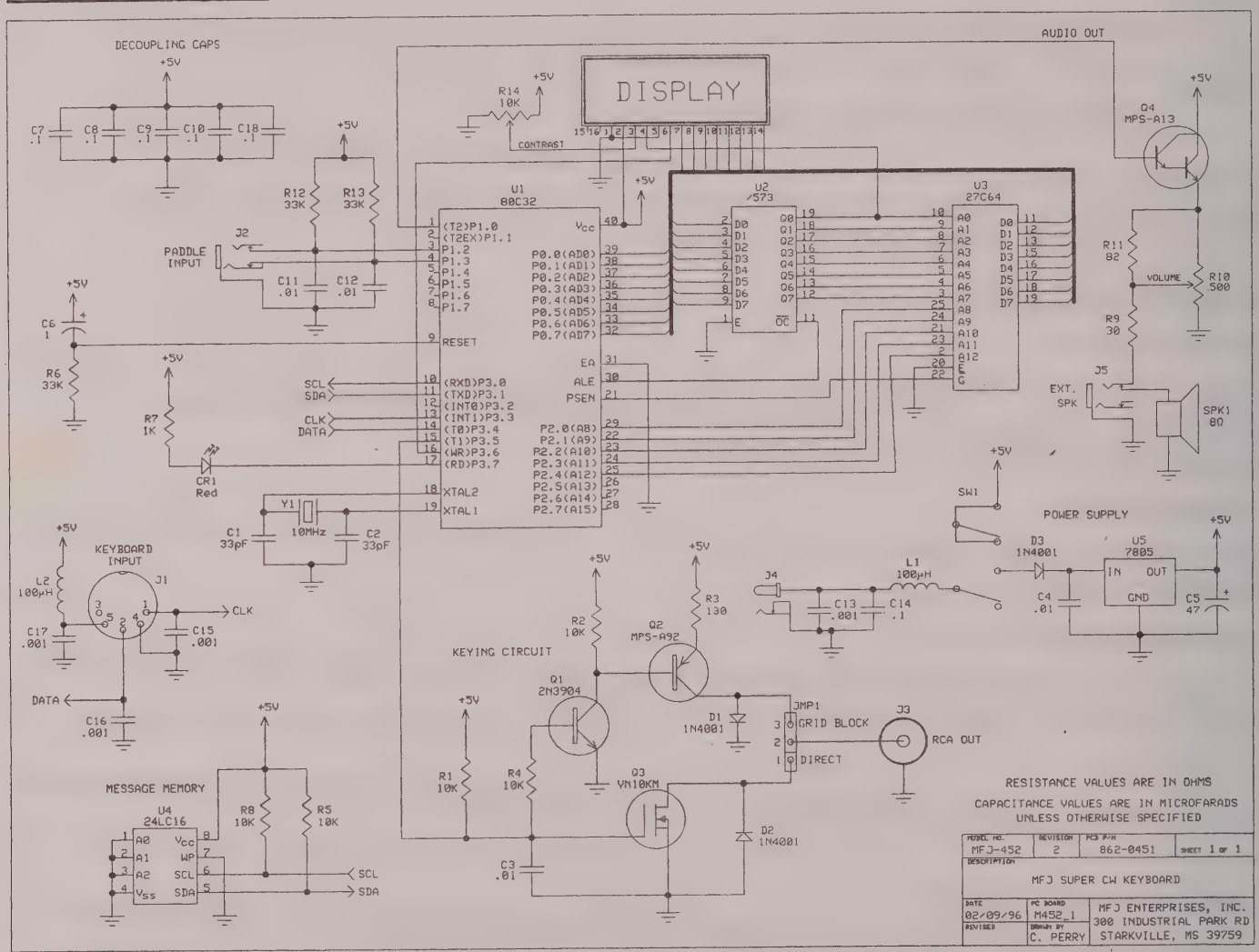
The paddle input allows iambic keyer operation. The speed, weight, and tone for the paddle are the same as that for the keyboard. All iambic paddle parameters are controlled by the keyboard.

## Technical Assistance

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual, you may call *MFJ Technical Service* at **601-323-0549** or the *MFJ Factory* at **601-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, INC., 300 Industrial Park Road, Starkville, MS 39759; by FAX to 601-323-6551; through Compuserve at 76206,1763; or by email to 76206.1763@Compuserve.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

## Schematic Diagram:



## Keyboard Character to Morse Code Table

| Keyboard Key | Morse Character | | Keyboard Key | Morse Character | | | |
|---|---|---|---|---|---|---|---|
| A | A | .- | 5 | 5 | ..... | | |
| B | B | -... | 6 | 6 | -.... | | |
| C | C | -.-. | 7 | 7 | --... | | |
| D | D | -.. | 8 | 8 | ---.. | | |
| E | E | . | 9 | 9 | ----. | | |
| F | F | ..-. | 0 | 0 | ----- | | |
| G | G | --. | . | . | .-.-.- | $\overline{\text{AAA}}$ | |
| H | H | .... | , | , | --..-- | $\overline{\text{MIM}}$ | |
| I | I | .. | ; | ; | -.-.-. | $\overline{\text{KR}}$ | |
| J | J | .--- | : | : | ---... | $\overline{\text{OS}}$ | |
| K | K | -.- | ' | ' | .----. | $\overline{\text{WG}}$ | |
| L | L | .-.. | " | " | .-..-. | $\overline{\text{AF}}$ | |
| M | M | -- | / | / | -..-. | $\overline{\text{DN}}$ | |
| N | N | -. | ? | ? | ..--.. | $\overline{\text{IMI}}$ | |
| O | O | --- | - | - | -....- | $\overline{\text{DU}}$ | |
| P | P | .--. | _ | _ | ..--.- | $\overline{\text{IQ}}$ | |
| Q | Q | --.- | = | = | -...- | $\overline{\text{BT}}$ | |
| R | R | .-. | + | + | .-.-. | $\overline{\text{AR}}$ | (1) |
| S | S | ... | ! | ! | ...-. | $\overline{\text{SN}}$ | (2) |
| T | T | - | @ | Error | ..... | | |
| U | U | ..- | # | Paragraph | .-.-.. | $\overline{\text{AL}}$ | |
| V | V | ...- | $ | $ | ...-..- | $\overline{\text{SX}}$ | |
| W | W | .-- | % | % | -.-.- | $\overline{\text{KA}}$ | (3) |
| X | X | -..- | ^ | K | -.- | K | (4) |
| Y | Y | -.-- | & | & | .-... | $\overline{\text{AS}}$ | (5) |
| Z | Z | --.. | * | * | ...-.- | $\overline{\text{SK}}$ | (6) |
| 1 | 1 | .---- | ( | ( | -.--. | $\overline{\text{KN}}$ | |
| 2 | 2 | ..--- | ) | ) | -.--.- | $\overline{\text{KK}}$ | |
| 3 | 3 | ...-- | tab | Paragraph | .-.-.. | $\overline{\text{AL}}$ | |
| 4 | 4 | ....- | | | | | |

Notes:
(1) Also 'End of Message'
(2) Also 'Understood'
(3) Also 'Start Signal'
(4) Also 'Invitation to Transmit'
(5) Also 'Wait'
(6) Also 'End of Work'

## Function Key Quick Reference

| Key | Usage |
|---|---|
| **F1** | Message memory #1 |
| **F2** | Message memory #2 |
| **F3** | Message memory #3 |
| **F4** | Message memory #4 |
| **F5** | Message memory #5 |
| **F6** | Message memory #6 |
| **F7** | Message memory #7 |
| **F8** | Message memory #8 |
| **F9** | Enables command mode. See **Command Mode Quick Reference**. |
| **F10** | Sets speed mode. Changes the WPM of the code. **Esc** exits. |
| **F11** | Engages the output tune. **Esc** exits. |
| **F12** | Decrements the serial number. The keyer will echo a "D" for every decrement. |
| **Alt** | Used for making prosigns by removing the intercharacter spacing of keys pressed while the **Alt** key is also pressed. For example, to produce the prosign $\overline{AAA}$ (.-.-.-) hold the **Alt** key down, press **A** three times, then release **Alt**. Also used in conjunction with keys **F1 - F8** to store message memories. |
| **Alt-Print Screen** | Plays the EPROM code version number of your unit. |
| **Backspace** | Deletes the last character entered into message memory or the last character entered into the type-ahead buffer if that character has not already been transmitted. |
| **Esc** | Exits any mode. |
| **Pause** | Enters pause mode. The keyer will stop the current message being played and will resume when **Esc** is pressed. |
| **Enter** | Stores a stop character at the end of message memory. |
| **Shift** | Enables upper case characters if applicable. If the upper case character does not have a Morse translation then the keyboard simply repeats the lower case character. For example, **Shift-A** is the same as "A" but **Shift** - ";" produces ":" |
| **Spacebar** | Inserts a word break space into the message in normal operation. While the MFJ-452 is in handkey mode the spacebar is a straight key. |

## Command Mode Quick Reference

| Command | Description |
|---|---|
| W | Weight set mode |
| T | Sidetone frequency set mode |
| O | Output key on/off |
| S | Serial number store |
| H | Handkey mode |
| R | Enable random code generator |
| F | Farnsworth random code spacing on/off |
| Q | Query (see "Q" in the COMMAND MODE section) |
| **Random Code Command** | **Description** |
| A | Random alphabetic characters on/off |
| N | Random numeric characters on/off |
| P | Random punctuation characters on/off |
| G | Random prosign |
| L | Random 1-8 character group length on/off (off denotes fixed 5 character group length) |
| C | Fixed 6 character sets on/off (off denotes random characters selected from full alphabet, numbers, punctuation, etc.) |
| 1 | Sets fixed character set 1 |
| 2 | Sets fixed character set 2 |
| 3 | Sets fixed character set 3 |
| 4 | Sets fixed character set 4 |
| 5 | Sets fixed character set 5 |
| 6 | Sets fixed character set 6 |
| 7 | Sets fixed character set 7 |
| 8 | Sets fixed character set 8 |
| 9 | Sets fixed character set 9 (see "#" in the COMMAND MODE section) |